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Oregon Kills Privacy Protection Bill

SALEM, Ore. — While Iowa and Massachusetts were fighting to protect their citizens' rights of privacy [CW, July 11, Aug. 1], a bill supporting personal privacy in the use of law enforcement computers died in Oregon's Senate Judiciary Committee late last month.

The bill would have granted a citizen access to his own records in police computers, required that arrest records be expunged in the event of an acquittal and prevented the use of "intelligence" information in the computer.

"Intelligence" refers to information relating to a person's political affiliations, social group affiliations, financial status,

religious preference, relatives — information that is outside the criminal law enforcement field.

House Minority Leader Gordon MacPherson (R-Newport), the chief sponsor of the bill, attributed its death to Senate Judiciary Committee Chairman Betty Brown's refusal to call a hearing on it. The bill had previously passed the House by a vote of 52-8.

If a special session to be held in January 1974 is not devoted to fiscal matters, the bill may be reintroduced then; if it cannot be reintroduced then, January 1975 is the first date it may be reconsidered,

according to Rep. Mary Burrows (R-Eugene), a cosponsor of the bill.

"We'll have to wait until possibly January 1975 unless people have the initiative to put it on the ballot, but I just don't think this will happen — people here aren't that in tune with the problem," Burrows said.

U.S. Drug Program Draws Opposition

(Continued from Page 1)

and Fifth Amendments to the Bill of Rights, violate the doctor-patient confidentiality principle, violate the right of juveniles to be protected against public disclosure, and the right of privacy, of course, is completely vitiated by this system," Klein said.

Pennsylvania Letter

In Pennsylvania, Dr. Richard E. Horman, executive director of the Governor's Council on Drug and Alcohol Abuse, has sent a letter to all drug and alcohol treatment programs in the commonwealth, saying: "You are... advised that disclosing any information which can identify an individual who is, will be, or was, in your program to the Federal Government or its contractors is illegal."

Though it did not mention Codap by name, the letter defined "identifying information" as including those items asked for by Codap.

In Massachusetts, Sargent last week sent a letter to Caspar Weinberger, secretary of the Department of Health, Education and Welfare, stating: "Mandatory participation in Codap requires states, cities and individual drug treatment programs to make a cruel choice — whether to accept needed federal funds for treatment programs at the expense of individual clients' rights or to reject these needed funds to protect clients' rights at the expense of providing drug treatment services..."

"I assure you that Massachusetts will join with the National Institute of Mental Health in building an accurate national computerized data bank to retain pertinent and useful drug information statistics, but not at the expense of an individual's rights."

Boston Mayor Kevin H. White, in a letter to the National Institute of Mental Health, which has committed \$2 million in federal funds to two Treatment Alternatives to Street Crime (Tasc) programs for Boston, said the city will not participate in the program as it is presently structured. The letter stated the system "does not play a significant role in the successful operation of drug treatment programs, but it could have a disastrous effect on an individual who needs drug treatment now."

Mass. Joins ACLU in Bid to Halt Operation of FBI's CCH System

(Continued from Page 1)

dated to show ultimate disposition.

• "Insure adequate opportunity for file subjects to have notice of and opportunity to challenge the contents of their files.

• "Require periodic review and expungement of files, thus permitting inaccurate, incomplete and outdated records.

• "Properly control access to CCH files, permitting dissemination of file material for purposes unrelated to legitimate law enforcement needs."

"We have already paid a price for this defense of our people's rights," Sargent said at a press conference citing the loss of \$30 million in Small Business Administration loans destined for Massachusetts [CW, July 11].

The petition's memorandum charged:

"The present operating policies intended to control file content, access to the files, updating and purging procedures, and rights to individual notice and challenge are so lax as to permit and encourage violations of rights protected by the First, Fourth, Fifth, Sixth, Eighth and Fourteenth Amendments of the United States Constitution."

On the question of the specification of offenses included in the file, the memorandum found that inclusion of an individual's record in a national file is "far more detrimental to an individual than inclusion only in the files of the state, or states, in which he has had contact with the criminal justice system, because of the vast increase in dissemination of his history which results..."

"The failure of the Justice Department to define what acts can precipitate these harmful and far-reaching consequences of such national classification violates traditional due process protections."

The paper, in calling for records of the dispositions of arrests, said experience

indicates that information "beyond the arrest stage is rarely entered into the files, thereby leaving the files replete with arrests that did not result in conviction, or even prosecution, but which are not so designated..."

"Inclusion of the arrest records that did not result in conviction in the CCH file can have highly prejudicial effects; the files are routinely made available to federal agencies, and to national banks and to other national employers seeking to clear job applicants; they are similarly made available at the state level for employment clearances by state agencies, and by a host of private employers that are licensed or regulated by the state."

Access Easily Accessible?

The memorandum discussed the control of access to the data bank's information and found that "any inquiry which comes in from any of these 45,000 user terminals is automatically answered by the computer, and it is presumed to be a request properly within the official mandate of the user agency without further check into the authority and motives of the terminal operator or the eventual recipient of the data."

"A state with proper concern," the paper went on, "for the rights of its citizens — which by statute severely restricts the uses of criminal records and imposes real sanctions for violations — surrenders its citizens to the abuses permitted by the lowest standard of the 50 states and 45,000 terminals. For this very reason, Massachusetts has refused to join the NCIC system."

Joining the ACLU in the petition were several other organizations and representatives of all 50 states, including Sen. Edward W. Brooke (R-Mass.), Sen. Harold E. Hughes (D-Iowa), U.S. Rep. Michael J. Harrington (D-Mass.) and U.S. Rep. Barry Goldwater Jr. (R-Calif.).

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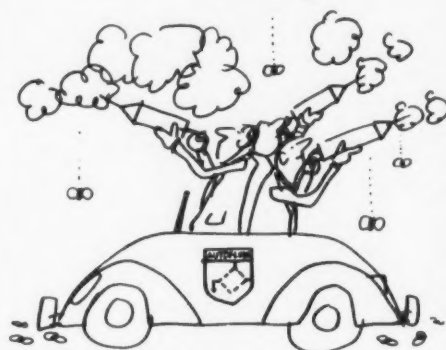
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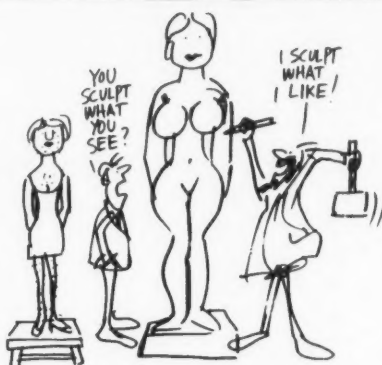
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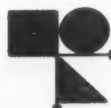


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NBS Set to Aid Municipalities In Putting Order Into Systems

By Edward J. Bride
Of the CW Staff

CHICAGO — The Federal Government, through the National Bureau of Standards (NBS), wants to help put "some order into the disarray" of computer systems and software being used by state and local governments today.

"Almost every government unit tries to develop its own packages," according to Dr. Ruth Davis, director of the NBS Institute for Computer Science and Technology.

User groups must have some authority for deciding on application development, and she offered NBS's help to the states in developing standards.

Semper Paratus

"The National Bureau of Standards stands ready... as the recognized responsible agent in government" to handle the problems of software standardization and exchange among the states, she com-

mented.

She proposed that Nasir and NBS join in an effort that would put data security as its top priority, with specific, separate user groups being formed for specific applications.

She concluded by calling for the extension of the Federal Government standards apparatus into state and local problems.

Davis's prepared speech at last week's Nasir conference was delivered by Deputy Director Zane Thornton.

Davis was recuperating from injuries suffered in an auto accident.

It is necessary that all government computer users cooperate "formally and fully" to share technology, she stressed. These users, she suggested, have an important common bond, the "proper and humane application" of computers.

Effective government operations depend on the availability of information, according to Davis. She suggested that information should be available in central locations, which should be accessible by decentralized users.

In other words, neither the government nor private sectors need to be "collectively together" for effective service. Information must be centralized, but not organizations, she suggested.

'Look Around'

Leading up to her offer of NBS help, Davis suggested that government users should also work within standard, existing mechanisms for effective computer usage. The patent and copyright systems, current user groups and other technical means should all lead users to believe that there is "no need to bemoan the lack of a government policy on automation."

Government users must cooperate, so as not to dissipate technical expertise, and the NBS is anxious to join with the states in developing standards for such areas as security and privacy, she continued.

Davis turned her attention to ASCII as a possible federal standard. She noted it is not easy for government to undertake any action-oriented role, but the alternative to action is "increasing impotence" in the use of computers.

City Committed Sans Funds

(Continued from Page 1)

A second city problem is that since no money has been legally allocated, where does the city expect to get the needed rental money?

"Everyone knew as long as a year ago that we intended to get a 145," stated Howard Lewis, city DP manager and chapter president of the Data Processing Management Association. Howard argues that since other people knew of this intention and since none of them offered alternatives, the city must continue with its plans for an IBM machine.

"We've spent a lot of time and money getting ready for the upgrade to the 145, and at this time we need more computer power so we are committed," he said.

The Other Vendors

But other vendors claimed that over a year ago they asked the city for a chance to bid on the proposed system.

These vendors maintained they were told the agreement with IBM was only in the form of a letter of intent, and as the city had neither the inclination nor the legal right to get the computer without approval, these other vendors need not be concerned.

This was the situation until this summer when the city decided to go with IBM, with the new computer due Aug. 28.

Honeywell personnel in particular went to city hall arguing this move was illegal since no public bids had been proffered. City hall officials confirmed that public bids must be offered but claimed they

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Checks should be made payable to Boston University-SPC and sent to Mrs. Shirley Coyne, Boston University School of Public Communication, 640 Commonwealth Ave., 02215.

Solutions Not Data Sell DP Idea

(Continued from Page 1)

and the first factor Hovey cited is salary. "State salary structures are inadequate" to attract the right people.

One of the reasons behind this is an extra level of management between the computer installation and the executive (the governor) in most states, he related.

Not that there isn't enough money to go around, he said — the problem is the way the available funds are allotted.

This factor leads to the second cause of misuse: state government employment is attractive to two kinds of people, namely those unqualified to do an equivalent level work on the outside, and those planning to use state employment as a training ground ("people looking for experience at state expense"), he said.

Aside from the user-vendor relationship,

other human problems stifle effective computer use in government, Hovey continued. There is currently, for example, a tendency to build new systems from the bottom-up, rather than top-down.

This means that designers identify all the possible data to be gathered and processed by new systems, and then figure out how to get all the data to top management.

Instead, designers should figure out what top management needs to know and then develop a system.

After identifying these problem areas, Hovey suggested the adoption of "easily adaptable standards" to help measure performance.

His standards would relate first to management and then to applications.

The first requirements would include complete documentation, the use of general programming languages (Cobol, for example, rather than vendor-specific languages), competitive procurement, high machine utilization (75% in-use time), salaries equivalent to outside organizations, protection of sensitive information, systematic training and the central review of acquisition decisions.

Regarding specific applications, Hovey suggested less manual handling of data ("the last manual operation in a payroll should be the entry of hours worked"), improved accounting to user agencies, and Medicaid reports with specific information on both clients and vendors (suppliers of health services).

Money Problems?

CHICAGO — The "dichotomy" of providing increased service with less money seemed to be on the mind of many DP managers who attended the fifth annual conference of Nasir.

This problem exists in government in general, but is especially prevalent in data processing operations, several speakers noted.

And from the audience, Arthur Hill, DP director for the State of New Hampshire, related how Gov. Meldrin Thompson had cut the current DP budget 40%, and threatened to cut it again by Sept. 1, if a long-overdue management information system is not up and running by that date.

Hill quoted from Thompson's budget message that the millions of dollars of "computers that don't compute" and the 19-month delay on the MIS represent the "biggest scandal in the history of the state."

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Who's Endangered?

Polar Bears Attack Data Stations

ANCHORAGE, Alaska — Polar bears are an endangered species but don't tell that to the researchers associated with data entry operations in the Far North where several systems run by the Department of Commerce have experienced attacks from the Ursus Maritimus.

The Commerce stations are special-purpose data reporting buoys placed in the Arctic ice drift by the National Oceanic and Atmospheric Administration (NOAA) to provide environmental data on air pressure, temperature and ice movements. The information is then transmitted by satellite to an NOAA computer in Fairbanks for processing.

The polar bear attacks were apparently one of the reasons for failures of some of the buoys. Researchers said examination of one of the buoys revealed that bears had chewed through the wiring on the outside of the unit.

Two of the systems are still operating in the ice pack despite storms, drifting ice and temperatures ranging to 50 degrees below zero.

Two other systems placed in the ice pack failed after less than three months, the Commerce Department noted.

Want to Cut Coding Time? Try Dictating Instructions

(Continued from Page 1)

learning curve bias, Bloom also built time delays into his test so that a programmer would not repeat the same type of task any sooner than four days, nor would he work on separate tasks within a program without a day in between.

The dictation equipment used included microphones at each programmer's desk, feeding into a central record/playback device. This gave each worker immediate access to the system and no excuse for working with a coding sheet "until a recorder was available."

It also avoided the problem of transporting cartridges or transcription belts to the keypunch operator, and allowed her to work at a more even pace.

Further, the setup may have avoided any tendency on her part to put aside any particular programmer's work in favor of another's, a situation that can occur in working with coding sheets.

In any case, the punched coding was given to Bloom and never returned to the programmer, apparently another attempt to avoid a learning curve bias.

The operator had an average of 5.8 errors per 100 cards punched via dictation vs. 4.7 errors per 100 cards punched from coding sheets, but Bloom saw this as unimportant. He blamed a failure to

follow faithfully the "spoken word/symbol punched" conventions that had been developed, and "some confusion" about continuing coding that was too long for a card.

As an example of the violation of dictation standards, Bloom found that the operator might actually go ahead and punch AND even though her instructions were to punch the spoken word AND as "&."

Based on his experiment, Bloom argued that "dictation equipment would have to be quite expensive to be unjustifiable to an organization." A system with a one-time cost of \$5,000 would, in his view, increase staff productivity by an extra half a staff member, "who would cost \$5,000/yr as long as he was with the organization."

You're Wanted, Arthur

WINSTON-SALEM, N.C. — The Raleigh police computer is such a stickler for correct spelling that it is willing to let an escaped felon get away.

Sgt. R. L. Haskins spotted Arthur T. Mankins, a man he thought was supposed to be in prison, doing 40 years for robberies. Rushing to the police station, Haskins had Mankins' name processed on the Police Information Network (PIN).

The computer reported no record of Mankins being out, even though a notice of his escape had been placed on PIN only an hour before.

That was six days after Mankins had escaped from the prison laundry near Clinton.

"I hadn't noticed," said J.W. Wilson, director of the fugitive and extradition office, "but the PIN operator here spelled Arthur 'Arthus.' Maybe the machine won't kick out Arthur Mankins when it has been asked for Arthus."

Eight days later another statewide alert on Mankins appeared over PIN, not as an escapee but as a bank robbery suspect. This time "Arthur" was apprehended.

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Graham, Texas 76046

New DP Facility Also Seeks to Escape Ills of City

NEW YORK — In what would be considered an act of compassion if directed toward humans, the New York Life Insurance

Company is moving its computer away from the noise, dirt and commotion of city life.

The company plans to build a

new computer facility in remote Hunterdon County, N.J.

A number of factors entered into the decision, according to company spokesman Frank Lauer. "Costs in the city, the problems of electric current, telephone service, taxes and the desire of a lot of our people who commute to have a facility closer at hand were all factors," Lauer said.

Marshall F. Bissell, president, said, "The company's operations are increasingly being converted to electronic data processing and it is necessary to set up a computer facility to parallel our pre-

sent computers."

Power Problems

Several New York computer installations have been experiencing difficulties with voltage cutbacks resulting in brownouts and blackouts. IBM machines, for instance, have a built-in tolerance for an 8% drop in voltage. There have been recent cutbacks of 5% by the New York State and New England power pools.

"I think that rather than parallel operations, we plan to maintain terminal computers in the present site and have our main computers at the remote site,"

Lauer said, "with communications between the two. It's a question of support, the ability to limp along until something is repaired if we have a problem at either facility."

Buildings in the city were also a factor in the move. "Building sites in the city are difficult to obtain," Lauer said, "and the building we're in, while it's an architectural beauty, is not conducive to modifications which are necessary in terms of computer facilities. Hence the remote site."

Lauer speculated that hardware for the new facility will probably be 370/168s.

Laser, DP Used in Cancer Detection

ROCHESTER, N.Y. An automated prescreening system for the detection of cancer cells is being developed at the University of Rochester Medical Center, under a three-year contract with the National Cancer Institute.

Detection of cancer cells involves staining the cells with a fluorescent dye. Under ultraviolet radiation, green light is given off by the cell. The amount of green light is related to the amount of DNA in the cell; elevated DNA is evidence of abnormality, explained project director Dr. Leon L. Wheelless.

The new system, according to Wheelless, will use a laser, on-line to a Linc-8 computer, to excite fluorescence. "We find a cell, take measurements on it and tell the computer what type of cell it is so it can build up a data base," he said. The system has the potential of screening hundreds of cells a second.

Wheelless, who is associate professor of both pathology and electrical engineering at UR, designed and wrote the program himself to help cytotechnologists use their time more effectively in screening pap smears for the detection of cervical cancer. "But," he said, "there is no reason why the same program cannot be adapted to any cells in body fluid."

"We estimate that it will be three years before we have an operational system," Wheelless concluded. "We've proven the concept, now we have to build the instrument."

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'Crib' Keeps a Watchful Eye on Dwindling Minerals

CW Washington Bureau
WASHINGTON, D.C. — Because the U.S. and the world face a shortage of most mineral resources, the U.S. Geological Survey here has called on a computerized system to help keep track of the dwindling reserves. The Computerized Resources Information Bank (Crib) is expected to aid researchers and geologists in organizing and analyzing the mountainous amount of information on mineral deposits.

The Crib system, run on an IBM 370/65 here using the University of Oklahoma Gipsy (Generalized Information Processing

System) software, presently contains information on approximately 22,000 mineral deposits, but has the ultimate capacity of handling 500,000 such records, according to Dr. James A. Calkins, manager and developer of the system.

Geologists Aided

Calkins described the system as basically an "electronic library" which relieves "the mineral geologist of the chores of handling endless documentary files of information" on mineral deposits.

"In the past, even when the basic mineral data has been avail-

able, the information has been cumbersome and slow to extract," he said.

"Even worse has been the problem of trying to retrieve information that might be filed in another state or misplaced when key personnel retire or transfer," he added.

Because of the "looming possibility of a mineral shortage to match the energy shortage," Calkins said it is "more and more important to keep our store of mineral information up-to-date, centralized and easily accessible to aid the decision-making process."

The system consists of a set of

variable-length records — each of which can be up to 32K characters in length — to describe a

mineral commodity, a mineral deposit or several related deposits.

Planning Keeps Things Peachy

BOSTON — An elaborate economic model is providing operational information on a day-to-day basis throughout the 12-year development period of Peachtree Corners, a 2,000-acre planned community.

The computerized model allows management to pinpoint what its cash position will be up to three years in advance, and to determine how almost any contingency will be reflected 10 to

12 years later on the bottom line.

The economic model consists of overlays of four separate programs.

A Real Estate Development program charts cash flow and profit and loss from the acquisition, predevelopment and resale of land, while a Land Acquisition and Re-Sale, No Development program charts the same information for property that is purchased for investment purposes only and resold without predevelopment.

A Properties Owned and Managed program provides projection capabilities, allowing assessment of the long-range effect of any contingency from decreased apartment occupancy to a change in plans by management.

A Normal Corporate Budgeting program charts overhead and operating costs at the corporate level and relates them to the other financial considerations.

These four programs are supported by two related programs for notes payable and receivable and for land inventory.

The economic model serves as two models — one carried on a 12-year basis, the projected development period for Peachtree Corners, the other on a 12-month basis which allows Duke Enterprises, the development company, to account for cash demand fluctuations within the 12-month period.

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Editorial

Security's Double-Edged Sword

With the Equity Funding scandal and IBM's recently released report on security, the topic of data security is again in the forefront as an area of concern. At the same time revelations from the Watergate investigation might give computer users pause to consider whether data security is indeed a double-edged sword.

No one denies the advisability of protecting data and computer equipment from disgruntled employees with magnets, visitors with large cigars who flick ashes on disk drives and people who might steal proprietary software for their own profit.

But the methods used to insure security can create an arbitrary secretiveness. It is easy to compile information that is self-serving and which violates the rights of others and protect it by labeling it "sensitive."

And it is reasonable to assume that if someone had suggested that an audit be taken of computer records in the Equity Funding computer room, Equity's management might have argued that this was unjust since this information was sensitive and proprietary.

So the solution is that while security is important a parallel effort must be undertaken to ensure that computers and computer professionals are not the unwitting tools of fraud committed under the cover of security.

Get Lost, Codasyl!

We have organization problems. First of all, there are too many: DPMA, ACM, IEEECS, ASM, ACPA, ASIS, SIAM. New ones appear almost overnight, old ones hang on and hang on. Local clubs go national, ACM opens a chapter in Antarctica, user groups bow to the whip, eager beavers swarm up the ladder of professional advancement — a Breughelian scene!

Most groups, however, have good intentions. Redundant they may be, poorly thought out, managed by mercenaries, bankrupt in six dimensions — but at least they mean well. Codasyl is different. Its purpose is villainous, and its execution of that purpose openly corrupt. It should have been drawn and quartered in the early sixties.

I'll assume almost everyone in the racket thinks magic languages are good, as a concept. We wrangle about PL/I and Algol, and about a near-infinity of dialects. But the advantages are pretty well accepted. The major ones for Cobol have always been machine independence, program transferability, an agreed language of discourse and a common training device.

All these point directly, completely and permanently toward a *standard* language, a Cobol clearly understood, universally taught and uniquely acceptable at compiler procurement time.

Codasyl, creator of the language and one of the very earliest proponents of these concepts (in Charlie Phillips' time, that is), now devotes itself to "improving" and "developing" — that is changing, and in many cases debauching — the poor dumb language. Worse than that, I'm convinced that the motivation has degenerated from oblivious over-professionalism to nasty commercialism: that the representatives of the software and

hardware outfits that now run Codasyl want to screw up the language and its users, to protect their company interests. These people use the language nuts, the honest enthusiasts, as tools.

A sure sign of corruption of purpose is secrecy and elitism in administration. The actions of Codasyl and its committees are proposed, executed, debated and readied

From the Editorial Director

for publication behind a very heavy curtain. Membership is guarded carefully, in spite of claims that the outfit is "an informal and voluntary organization of interested individuals, supported by their institutions..."

I believe Codasyl should be disbanded. I believe its attempts to "improve" Cobol should cease immediately, and that resolutions to that effect should be passed by Ansi-X3, by Ecma and by the Japanese. I believe its unwanted and self-serving attempts to move in on general language planning and definition should be taken over by the truly open professional society committees like Sigplan.

And finally, I believe individual users, user communities like Guide, and above all, purchasers of Cobol compilers should attack the hidden financial supports of Codasyl by insisting on a non-changing, non-improved standard Cobol: without gimmicks, without built-in connectors for future incompatibilities, without seductive novelties. Insist on fast compile times and efficient installation and low prices, and above all on good run times!

Herk Gronk

Letters to the Editor

Certification... For Programmers

Although there may be some need for certifying data processing managers (CDP), I feel there is a much greater need for certifying programmers. I would like to suggest the following categories be established:

CSP — Certified Scientific Programmer.

CCP — Certified Commercial Programmer.

CPP — Certified Professional Programmer (one who has passed both the scientific and the commercial tests).

Clyde L. Hart
Assistant Professor

Texas State Technical Institute
Waco, Texas

Computer No Salve

Dr. Howard Newcombe's solution [CW, July 25] for the detection of drugs, chemicals, and presumably "radwastes" harmful to humans by monitoring births, deaths and hospital records by

computer is all too common in the U.S. and Canadian nuclear community. The "safe until shown unsafe" philosophy is frightening in the field of pharmaceuticals; in the field of atomic energy it is terrifying.

York County, Pa. will soon be blessed with six of the world's largest nuclear power plants, emitting radiation hopefully below AEC permissible dose level. The 200,000 people receiving an accumulation of permissible doses have no choice but to act as guinea pigs in an experiment to prove that low-level radiation is harmless. The fact that a computer may be used to determine if it is "good for them or bad for them" is not in the least comforting.

The computer as savior to problems in atomic energy promotion is not new. When it was apparent that the loss-of-fluid test facility (Loft) (to be used for determining engineering parameters for the design of safety systems in pressurized water reactors) would not be operational before the first group of commercial pressurized water reactors went on-line, a series of computer programs was written to "verify the design" of the existing safety systems.

These programs were a great leap backward in the intelligent use of the scientific method. A series of interlocking hypotheses was used, without the help of experimental data, to predict events in the real world (i.e. the results of loss of cooling fluid due to a major pipe rupture).

It is not comforting to know

that the first of these six reactors will start up soon, months before its safety systems are subjected to tests at the Loft facility.

The main obstacle to this method of product testing should be humanitarian, not libertarian.

John H. Davenport
Vice-President

Ampersand Corp.
York, Pa.

What Caper Teaches

Re the editorial "Ends and Means," [CW, Aug. 1]:

I sincerely doubt the college students who cracked the scrambling code used in Hewlett-Packard mainframes have seriously compromised any educational process.

From a learning point of view, the thinking that goes into cracking such a code is of much greater value in our quickly changing times than any answers to any quiz which could be placed in a computer file.

Susan E. Jacobsen
Loma Linda, Calif.

The students may have learned much about software, and about security. The jeopardizing of the educational process is nonetheless a possibility with the suggested market today for tests, ghost-written theses, etc. It was the educational process of the populace, not merely the few students involved in the caper, that concerned us. Ed.

(Other letters, viewpoints on Page 12)



'There Must Be No Personal Data Record-Keeping Systems Whose Very Existence Is Secret.'

(Statement in HEW Report on Records, Computers and the Rights of Citizens, endorsed by Secretary Weinberger)

Symbols of Information Quality

Introducing Nokey Fenokey And Other Familiar Friends

Two acronyms I have used for some years, are Nokey Fenokey and Okey Fokey.

Nokey Fenokey, short for "Not okay, if not okay" has been very useful to describe applications which work beautifully if everything input is correct or nothing out of the ordinary occurs, but which are so lacking in control and error procedures that if anything does go wrong all hell breaks loose.

Okey Fokey (analogous to Hokey Pokey) is a half-way house to Nokey Fenokey. Okey Fokey is the expression I attach to a system when I can see it has no adequate controls against things going wrong, but where I have not yet been able to find anything that actually had gone seriously wrong, even when mistakes had occurred.

Symbols of Jeopardized Quality

To start with, there is the question of the quality of specifications. I find one of the worst and most frequent problems

effect said this is the best way to get the water to the town and the water will be fine when it reaches town.

In use, the sign indicates that the recommendations are based on half-experience (the Half-X case). Effectively it means that a Half-X report is inadequate — as inadequate as would be taking only builder's opinions as to the suitable quality of water needed for drinking purposes! No danger seen yet — but inadequate precaution taken to minimize trouble if it comes.

In the second diagram, Nokey Fenokey comes into play as the danger can be readily seen. A herd of mountain goats decides to use the aqueduct as a bridge and contaminates the water supply. This diagram represents a real danger to the final product, a direct result of using Half-X recommendations.

So, a specification calling for computer records to be maintained on magnetic tape without specifying that the tape records would be audit-checked at the start of each run (and thus risking the possibility that something might change them between the runs) would attract the Okey Fokey. As long as no one did change them, everything would be all right.

By contrast, if the specification calls for the use of tape controllers (which can

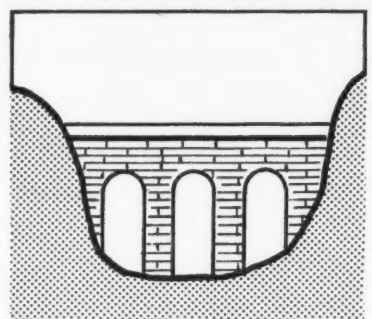
The Taylor Report

By

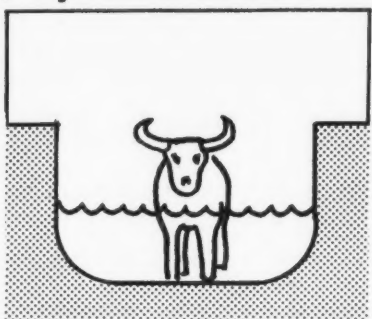
Alan Taylor, CDP



For Recommendations, Specifications...



Half-X or Okey Fokey sign indicates limited experience.



Nokey Fenokey sign shows real danger resulting from Half-X.

with specifications is that they are prepared by experts with heavy experience in only one narrow functional area. This is particularly dangerous in data processing, because an "expert" is able to bring to bear from his past experience much valuable detail in his area of expertise.

If, however, his experience only covers part of the need, and while he has the logical right to make some form of qualified recommendations, no final recommendation should be accepted. It may be positively wrong, although beautifully justified, from his own experience.

Aqueducts and Goats

In the symbology I use, I equate this heavy experience, narrow expertise concept to the expertise of early aqueduct builders. In ancient times, when the idea of water systems was originated, the engineers built great structures to carry water. The people who understood points of quality of water, and whether it was safe enough to drink, did not at first have very much experience. The aqueducts often were not covered, so that cows and goats happily walked from hill to hill through the cooling water.

This leads us to an Okey Fokey and Nokey Fenokey situation that can be illustrated by two diagrams.

In the first diagram, an aqueduct between two hills illustrates the Okey Fokey concept in which the aqueduct has been built using recommendations based upon the engineers' experience, but where the experience is not broad enough. The aqueduct builders have in

modify records without notifying the programmer — a technical point that few people are aware of), and for the use of standard vendor provided I/O routines — which don't take this point into account, then Okey Fokey is not enough. In this case, not merely a possibility, but a positive danger is known to be present. It gets the Nokey Fenokey.

In addition to the specification itself, we also have other areas that deal with information. When information is being processed, use of the flowchart for quality control is really impractical, unless you know the quality of the information coming in.

I use two different symbols for this.

First there is the case of untested information. Here I use the Closed-Eye symbol — meaning that so far as the process is concerned, the responsibility for quality is ignored. There is nothing necessarily wrong with Closed-Eye processing providing that it was preceded by some adequate testing.

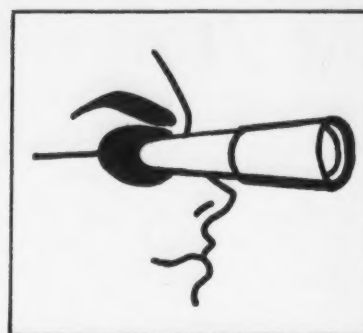
The second symbol I use is the "Nelson" or Blind-Eye with Telescope (BET). The Blind-Eye flowchart is a lot more dangerous than the Closed-Eye. BETs know full well that the efforts they are making to "check" or test the quality of the information are only partial. There are some types of known or obvious quality error which they simply do not check, and yet they claim to have per-

**One-eyed English admiral who refused order to retreat by putting a telescope to his blind eye and saying "I can see no signal — full sail on the enemy."*

For Flowcharts...



Closed-Eye symbol represents processing without testing.



Blind-Eye With Telescope or Nelson symbol indicates inadequate testing that is known to be inadequate.

formed "checking."

The testing itself can be said to be a cover-up for the continued use of inaccurate or improper processing.

Almost all card input usages should really be marked with the Closed-Eye. They rely upon verification of the input accuracy by someone outside the system — but do not check that the cards actually read in are ones that have been verified.

By contrast, the use of the Nelson symbol would be appropriate if verified cards continued to be acceptable without checking after it has become known that someone has been producing verification notches on non-verified cards — say by the use of an 80-column skip.

After specifications and the flowchart, we then have results. Here also signs are useful to denote quality. Items that are not justified on the output form — like bills that only give the amount, but do not give the basis for the computation — I regard as something with steps missing. So I put a staircase with steps missing.

Then there are those aggravating and excessively dangerous outputs which often logically say little or nothing, but which by their very existence seem to attract people to make use of them — such as a reference report from a previous employer.

ing into a swimming pool. Or at least what looks like a swimming pool.

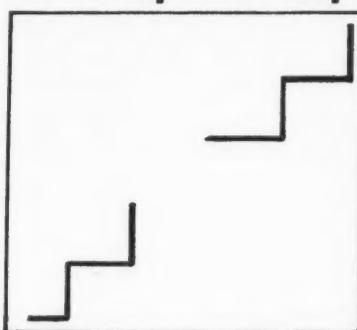
The reference is to a famous law case some years ago when someone named Rylands sued someone named Fletcher for keeping a sulphuric acid tank with sulphuric acid in it in a place where children could get in. A child — Rylands — had gone onto private property and seeing what seemed to be a swimming pool, jumped into a sulphuric acid bath.

Fletcher's defense was that as the child had no right there, the results were not his concern, no matter how disastrous.

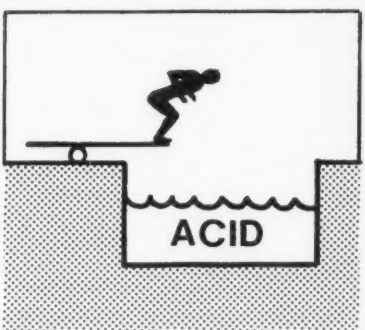
This defense was knocked down by the doctrine of "attractive nuisance," as the judge called it. The judge said that if someone voluntarily puts a dangerous item — like wild tigers or sulphuric acid baths — in a position which poses danger to outsiders, they must take into account the known possibilities of harm arising from their actions. In this case, one of the possibilities of harm was that a child could be attracted into its use, and jump over the inadequate fence in the way children have always jumped over fences.

An example of an attractive nuisance is the "slow payer" field in credit reports supplied by a department store to a credit bureau. There is actually no information directly about the person in this field. The store concerned may have lost his

For Computer Output....



Non-Sequitur sign denotes incomplete data.



Rylands or "Attractive Nuisance" symbol represents data which is dangerous but attracts users.

These reports should be called "attractive nuisances," and certainly need labeling by the "Rylands" symbol.

A little background is needed here to explain the symbol. It consists of the name "Rylands" over a stick figure jump-

payment — or may not have given him a reasonable time to pay his bill after receiving it. And, of course, there is the possibility that the object being charged was never ordered or never received.

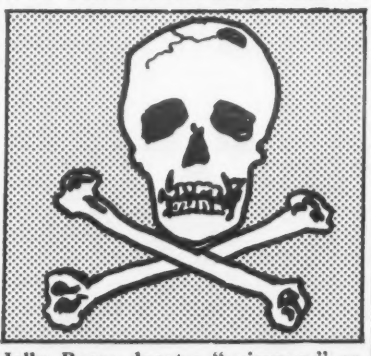
Yet, all these possibilities are ignored and omitted. The credit bureau's clients use the Slow Payer field, because they have nothing better to use. It is an attractive nuisance in that it attracts use, and its use can constitute a nuisance.

The last sign I use is for poisonous information, or misinformation — information that is poisonous because it is probably incorrect. It consists of a Jolly Roger mark on the grounds that this is the type of information which will grab any profit it can from its existence, without bothering about legal ownerships.

Typical cases are bills made out in such a way that people are induced to overpay without realizing it, or orders made out so that goods are sent without being ordered. I suspect that this sign should be further subdivided — so your suggestions are welcome.

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For Misinformation...



Jolly Roger denotes "poisonous" or incorrect information.

The Professional's Viewpoint

The Professional Manager Recognizes the Problem

By Tom Gilb

Special to Computerworld

The company or institutional DP manager is already in the middle of an increasingly embarrassing situation.

He is expected to manage the resources and the results of the DP department. He is expected to have reasonable control over the high risks of computer projects and he is expected to be the communication link between his DP technicians and the rest of the organization.

In most people's eyes, DP is characterized by "the computer," the hardware itself. The hardware itself is a highly predictable and manageable device. It has been designed on the basis of highly developed scientific and engineering principles. This obvious fact can mislead even professionals in the EDP field to believe they know something about "their discipline."

In fact, the real problems lie in the area

of "software" and "peopleware." Software is simply the non-hardware part of a computer. It is in a sense the melody and the choreography rather than the gramophone record or the TV.

IBM produced, from about 1963 to the present, a piece of software called Operating System (OS 360/70), which was a sort of operational manager and set of aids for large computers.

At the peak of the production effort over 5,000 programmers were simultaneously employed. After eight years of extensive testing and use and "improvement" by IBM and thousands of its customers worldwide it is still a great problem, as any "open" user will tell you.

It consumes unreasonably high amounts of hardware resources (by any comparative measure you like, including other similar products on IBM machines) and the reliability of the software is continually getting worse — every time IBM

"improves it."

From IBM's own numbers — 1,000 "bugs" per six months of life in the product's early days — the product has "improved" to nearer 12,000 new "bugs" in the product, which the user must find ways to live with.

Clearly IBM would not allow this to happen if it knew how to control it. Clearly, neither it nor anyone else really knows how to control the quality of such large software products. IBM bit off more than it could chew.

Problems? Yes, but problems are half solved by explicit recognition of their nature. Are there some professional solutions to these problems? I think so.

Good standard management practices would get us a long way. Most computer development projects are "high risk" and should be treated as such during evaluation and implementation.

If somebody promises you results, make

him put it in a clear contract, backed up by bank guarantees.

Education? In spite of the fact that degrees are being offered in "computer science," there is no such thing.

Thus we can "educate" in, perhaps, irrelevant subjects and we can "train" in quickly obsoleted subjects, but we cannot at present educate specifically for the technical and management planning and quality control problems of EDP projects.

The only sound advice might be, as with "arts" graduates, to give the students a sound classical basis and a broad point of view, and then, to let them loose on the world.

The first step we professionals have to take is recognizing the problem. The DP manager should prove his professional competence by clearly noting the degree of risk and the unknowns of the proposals he recommends.

You can support effective communication with your EDP management by openly encouraging him to spell out the unknowns and the risk areas, and to spend more time seeking knowledge to close the "uncertainty gap."

Tom Gilb is an independent EDP consultant and past president, Norwegian Computer Society.

A Surprising Comparison

INSCO vs. NCSS

Choosing a timesharing service isn't easy. There are a profusion of suppliers offering a wide range of services at widely varying prices. To help cut through the confusion, we offer this first in a series of comparisons between INSCO: Timesharing and other major services. In addition to the latest published prices available, we also compare commonly accepted criteria for selecting a service.

COST	NCSS*	INSCO	Per Cent Savings
Per CPU Second (256K Machine)	\$.38	\$.27	29%
Connect Time (10, 15, 30 Characters/Second)	\$10.00	\$8.00	20%
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Disk Storage (Per month per cylinder where cylinder equals 125,000 characters)	Sliding Rate \$20.00-\$10.00	Flat Rate \$10.00	0-50%

*Based on Published Price List Dated April 16, 1973

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NCSS

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NCSS

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INSCO

Service is available through a nationwide network of 30 centers.

NCSS

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INSCO

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Letters to the Editor

Reader Questions Official's Propriety

Regarding the Page 1 article in the Aug. 1 issue, many persons seemed quite upset by the fact that a girl allegedly attempted to sell proprietary source code for \$2,000.

I wonder if at least an equal amount of concern was expressed over the impropriety of the president of a brokerage house being on the board of directors of the service bureau which was awarded a \$70,000 contract.

Rudolph B. Phillips

N. Massapequa, N.Y.

The article did not discuss the amount of the contract, although it did state the service bureau had spent \$70,000 to develop the software. Presumably, the contract would have been for much more, if the software was the exclusive property of the customer (the brokerage house).

The contract would certainly have been for much less than \$70,000, if the service bureau retained the rights to market the programs elsewhere. Ed.

CW and Family

Does any computer, peripheral, teleprocessing equipment manufacturer, broker, or any related equipment sales or leasing company or any software supplier own any interest in the net proprietorship of the company that publishes CW?

The above question is asked not by idle curiosity; we have been subscribers for several years and use the data you publish to a considerable extent in our current evaluation of replacement equipment for our existing installation.

While interviewing vendor representatives, one of them told us that CW is owned by one or both of certain computer manufacturers.

Name Withheld by Request
Los Angeles, Calif.

We are required to publish a circulation statement, which includes naming our ownership, every fall.

But to reiterate the last (and the next) statement, Computerworld, Inc., is 100% owned by International Data Corp., a privately held company. The controlling interest in IDC is held by Patrick J. McGovern, president. There is no outside beneficial interest in the private stock of IDC, although IDC sells its market research services to many companies in the computer industry.

SOFTWARE & SERVICES

Random Notes

CDC, SBC Nets Begin Merge, Common Dialup on the Way

MINNEAPOLIS — Control Data has integrated the managements of the Cybernet and Service Bureau Corp. remote computing networks, but the change has no immediate impact on users of either service.

A design goal is to permit users to dial one number and access either net, a spokesman admitted, but for now it is still necessary to use separate numbers to access the separate nets. Neither is it possible now to shift programs from one net to the other without conversion.

Changeover to a single net, or to a closely coupled dual net, seems likely during 1974, according to industry sources.

Varian's 'Best' Made Better

IRVINE, Calif. — Special driver routines from Varian Data Machines (for \$10 each) allow Varian 73 or 620 computers operating under the Basic Executive Scheduler and Timekeeper (Best) real-time monitoring system to support card reader, line printer, "rotating memory devices" (disk or drum) or tape drives.

Previously Best supported only teletypewriter or analog-to-digital converters.

The Best package itself costs from \$10 to \$50, depending on the choice of object or source code, and recording media.

Gas Pipeline Designers Aided

ST. LOUIS — Developers of gas pipeline networks may be able to cut capital costs 50% by decreasing main sizes to minimums for meeting gas volumes and pressure requirements, with network design and analysis programs from McDonnell Douglas Automation Co.

Developed by Consumer's Gas Co., Toronto, the program is on McDonnell Douglas's remote computing system. It can also be installed on users' in-house 360/370 systems with 256K core. The design program costs \$12,000; the analysis program, \$10,000. Monthly lease plans are also available from P.O. Box 516, 63166.

Mine Operations Optimized

PALO ALTO, Calif. — Open-pit mining may be more cost-effective if proposed operations are analyzed by the Optimum Resource Extraction (ORE) program developed by Systems Control, Inc. The program models the ore body to be developed, and determines optimal pit form, including bench contours and haul road ramps.

Systems Control, 260 Sheridan Ave., 94306, can run the system on its Univac 1108, is adapting it to a 370/155 environment and expects to be able to adapt it to other configurations as needed.

'Proper Prior Planning Prevents Poor Performance'

Good Planning Vital to CPE Projects

By Don Leavitt
Of the CW Staff

WASHINGTON, D.C. — The real cause of most computer performance evaluation (CPE) project failures is pure and simple lack of sufficient prior planning, according to a CPE analyst in the General Accounting Office.

Speaking to a Share users group meeting earlier this year, Dennis R. Chastain said that "the six Ps" — proper prior planning prevents poor performance — certainly apply to CPE projects. He noted there are basic areas management should consider in preparing for this type of project.

What Are Your Goals?

The scope and objectives must be defined, he said, noting "the only areas which should be evaluated are those known or strongly suspected of having performance problems."

Without specific objectives, a project is likely to be continued long after good initial results, "in the naive belief that additional significant improvements would follow."

"The old 80/20 rule nearly always applies in CPE projects," he continued,

explaining that, under the "rule," 80% of the possible improvement is made in the initial 20% of time and cost; the remaining 80% of time and cost is spent making the final 20% of improvement.

To know where a CPE project fits in an organization, the responsibilities of the project must be defined, Chastain went on.

Specifically, three levels of responsibility should be considered. The project may be asked simply to find the problems and provide information to management to work out the solution and implement any changes.

On the other hand, the CPE team may be asked to define the solution as well as the problem, or, taking the final step, it may be charged with implementing the solutions or insuring that they are implemented by others. Obviously, Chastain noted, the project's authority in the organization must be appropriate for its responsibility.

Attacking the Problem

Installations differ not only in what CPE projects are expected to do and where they derive their authority, but in

the basic form or approach used.

The part-time approach is typified by the systems programmer, often in a medium-scale installation, who tries to monitor and tune the performance of the system during relatively slack periods when he isn't coping with new releases of an operating system.

Group Sizes Vary

Independent groups vary widely in size — from one or two to 80 or more technicians — and in purpose, Chastain noted. Groups have been formed to provide programmers with technical assistance to make their coding more efficient; to perform internal audits to monitor the efficiency and effectiveness of all areas that affect productivity; or to use techniques such as simulation to design new software systems.

The ad hoc study team usually emerges when a specific one-time objective is defined, typically to ease management planning purposes.

In any case, once the required determinations have been made, the study team is disbanded and the personnel involved return to their previous responsibilities.

For the average installation, he said, he prefers a combination of the independent group and ad hoc study team. Under this plan, a small nucleus of experienced workers can be expanded as needs arise. It provides a continuous CPE effort without substantial cost, a central point for evaluation of complaints and an easy way to determine when a larger effort is required.

The degree of any project's responsibility has a bearing on the type and number of personnel who will be needed, and CPE projects are no different in this respect, Chastain said.

Even if the project is limited to looking at application programs, he went on, at least one highly skilled programmer will be required for each application language used by the organization.

GTE Financial System Extended, Now Covers DP Job Statistics

TAMPA, Fla. — Job processing statistics, multi-bank payment capabilities and a general ledger interface file have all been added to the Accounts Payable/Financial Management System now available from GTE Data Services, Inc.

The basic system performs input validation, payables accounting, file maintenance and report generation with a single pass of a master file. A series of 15 standard and five optional financial management reports are said to provide comprehensive operating statistics and a complete audit trail of all transactions, financial and otherwise.

The job processing statistics feature that has now been added supports the billing of computer services performed for a client. Counts of such things as cards read in, tape or disk reads and lines of print generated are accumulated for later print-out.

The multi-bank payment capability was added, GTE explained, because a number of companies need the ability to pay on more than one bank.

The optional general ledger interface file contains a record for each sub-ledger account on the user's master general ledger file.

The basic system pays automatically or on demand, calculating discounts avail-

able for prompt payments, but allowing for hold payments or partial payments as well. It can be structured on a calendar year or fiscal year. It accumulates costs by job, processes prepaid check data, produces general ledger cross references and forecasts future cash requirements and obligations.

The system is written in Cobol and has been implemented in 55K bytes under both DOS or OS/360-370. It consists of four programs and two sorts.

The system is available for \$7,500 from 5422 Bay Center Drive, 33609.

'Dfast' Manages DOS Disk Files

ENCINO, Calif. — Without modifying the DOS supervisor or a user's JCL, the Dynamic File Allocation System (Dfast) from Tower Systems Inc. allocates disk space at OPEN time, from areas not being used by other files, and releases unused space at CLOSE time, making maximum space available for other needs.

Dfast works with any 2311, 2314 or 3330 disk packs and with a range of file organizations including sequential, indexed sequential (Isam) and direct access. The new software handles system and compiler work files.

With Dfast, the programmer need only specify the number of tracks required for a file and not the starting relative address track number of the file, Tower said.

Dfast will not allocate space for files on the systems standard label area, the developer added, because of the contention between partitions for these file extents. Files that are not through user option to be handled by Dfast are passed to the DOS OPEN routine.

The package is available for \$3,750 purchase or under a choice of lease plans, from P.O. Box 1900, 91316.

'An Operator Mounted The...WRONG TAPE'

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Every day, in thousands of data centers throughout the country, this same scene is repeated. It can be prevented. Value Computing has developed a new and different approach to Tape Library Control. The VALU-LIB system will tell your tape librarian which tapes to withdraw to get the best multiprogramming schedule, and then generate the labels, if you'd like!

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Librarian List Lengthens

ELDORADO SPRINGS, Colo. — OS/360-370 users with growing tape libraries have still another alternative for monitoring their facilities with the release of the Tape Library Control System (TLCS) from Handley Computer Systems, Inc.

The system allows the user to maintain current information on each tape volume in the installation, supporting orderly use of scratch tapes while adding an additional protection against unintended loss of still valuable data.

This librarian is simpler than some and requires the user, rather than any job accounting function of the operating system, to post entries to the control file. That costs the user time and effort, but keeps the cost in dollars lower — at \$750 — than would be possible with more complex systems, the company noted.

In addition to the library control file maintenance program, there are two report operations. Status reports list all active volumes and provide a "scratch" list for operator use.

Handley can be reached through P.O. Box D, 80025.

DP Support Packages Are Catalysts For Effective Program Development

By Don Leavitt
Of the CW Staff

MIDLAND, Mich. — Many DP managers talk about improving the interaction of hardware, software and people to make operations more effective. The Business Information Systems (BIS) group at Dow Chemical's world headquarters does more than talk — and it gets results.

The corporation has some 60 project leaders, analysts and programmers in BIS, working in a 2.5M-byte 370/155 Hasp/RJE environment, and they use a

wide range of software systems to support development work and production efforts.

Application Software's Asi-st report writer, for example, is made available directly to end-user departments, with skeleton JCL entries and customized Asi-st coding sheets.

The result, according to project leader Stephen Whipple, is that managers, accountants and even secretaries "can usually create pretty decent reports with very little DP knowledge."

To develop the mainstream

logic of new systems, BIS relies heavily on a decision table translator it developed internally some time ago, (and now marketed by Software Assistance Corp., Ann Arbor, as Detab-70).

This package, he said, converts table entries into any of three source languages including Cobol and not only cuts down coding time but imposes a standard documentation form as well.

BIS doesn't use flowcharting as a regular programming tool, Whipple noted, and in fact options on an automatic flowcharting package were dropped when management realized that no one was really using it. Flowcharts require constant maintenance and they are not as easy to understand as decision tables and module function maps, he added.

The development group also utilizes software packages in the program test, compilation and maintenance phases of its operations. The Datamacs test data generator from Management and Computer Services (Macs) eases that chore, and the optimizing feature of IBM's ANS Cobol is used to improve core utilization and execution speed.

Whipple observed, however — with an obvious sense of pride — that Dow probably doesn't get as much benefit as other shops from the optimizer "largely because our Detab processor produces more efficient code than the normal Cobol programmer."

Program 'History'

The Dow installation utilizes Panvalet source library control software from Pansophic Systems to avoid mishandling of source decks, use of an out-of-date version of a program and to provide programmers with a clear "history" of how a program had changed over time.

No one at the BIS group uses hardware or software monitors or other performance measurement tools — except, perhaps, Systems Measurement Facility (SMF) under OS/360 — but Whipple said he wasn't involved in any discussions dealing with this area of DP support so he didn't know why Dow doesn't use them.

Dow is in what Whipple called a massive data base development mode: "a five-year plan, and we're in about the second year." The company is moving toward IBM's Information Management System (IMS) as a target, but the current hardware is crowded enough so Dow has to "use the old shoehorn" to get the IMS software in, even in its current "embryo" stage.

The situation will be relieved, he said, once the second 370/155, "probably with 2M bytes," is delivered and the two systems are lashed together under ASP.

Meanwhile, some data base systems — notably one dealing with timely updating of orders-in-process — have been written using the Total data base management system from Cincom Systems. Whipple pointed out that Total was brought in with the knowledge that it would be replaced once IMS was fully operational.



Blue Cross of Florida improves service with "Silent 700" ASR Terminals

Silent 700* ASR twin cassette data terminals have been selected by the Blue Cross of Florida Plan, for their communications network serving 148 hospitals. Transactions are typed onto cassettes daily by hospital personnel for after-hours transmission from an unattended terminal to their central data center.

Increased claims load and expansion of services by the Blue Cross Plan required upgrading

their teletypewriter network. "We studied data terminals and the companies making them for two years before making our decision," reports C. R. Scott, Manager of EDP Planning.

"Silent 700 ASR terminals met our requirements. In addition, they are quiet...most important for our 148 hospitals. The terminals are attractively styled and the low price is vital."

Quiet electronic printing, cas-

sette storage, automatic search, and data rates up to 1200 baud make Silent 700 ASR terminals powerful alternatives to conventional teletypewriters.

For more information on Silent 700 terminals for your application, contact the nearest office listed below or Texas Instruments Incorporated, P.O. Box 1444, Houston, Texas 77001. Or call (713) 494-5115, ext. 2126.



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TEXAS INSTRUMENTS
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COMMUNICATIONS

Data Briefs

Singer Adds 101 Processor To System Ten Series

SAN LEANDRO, Calif. — Singer Business Machines has added a communications-oriented processor to the System Ten line.

The Model 101 processor performs both on-line and remote transmission. With a synchronous communications adapter, the 101 can transmit data to other processors and with its asynchronous terminal adapter the 101 can handle slow-speed ASCII terminals.

Two versions of the 101 will be available. A card-oriented remote job entry version with 10K processor, card reader, terminal and line printer costs \$40,360. A disk-oriented version with a 20K CPU disk storage, CRT and line printer costs \$61,285. Lease terms are also available and delivery on the 101 is 90 days. Singer is at 2350 Washington Ave., 94577.

That's a Switch!

WILTON, Conn. — T-Bar, Inc. has an unattended remote control (Aurc) switch for use in data and telecommunications applications.

Aurc can turn on or off branch office computer or communications equipment, monitor distant data lines, reconfigure unattended hub processors, bypass faulty lines or apparatus and can preprogram substitution of on-line equipment with standby equipment, according to the firm.

Aurc costs \$500 to \$3,000 depending on the number of channels and is available in units with eight to 100 command capacities. Delivery is eight to 12 weeks from 141 Danbury Road, 06897.

For Your Reference . . .

WATERFORD, Pa. — Elgin Electronics, Inc. has a reference card that lists all Bell connecting arrangements together with the Elgin equivalent units.

Both telephone company code designation and Elgin model numbers are included. The card is free from Elgin at Walnut St., 16441.

Novation Has OEM Coupler

TARZANA, Calif. — Novation Inc. has an acoustic coupler assembly of acoustic cups, bracket and printed circuit card, packaged in a modular assembly and aimed at OEMs.

The 4 in. by 9 in. printed circuit card contains all the electronics. The standard unit operates in the acoustically-coupled originate-only mode, but DAA capability can be put on the same PC board, as an option.

The price is \$99 in quantities of 100, with delivery of standard units in 30 days from 18664 Oxnard St., 91356.

Bell Users Favored?

Senate Told of AT&T 'Unfair' Practices

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. — The Bell System telephone companies "try hard to improve the telephone line for Bell modems in case of difficulty," but when non-carrier data sets are installed, line quality may merely meet "rather loosely written" tariff requirements.

And since AT&T supplies both modems and line service, there "exists a conflict of interest and a potential for unfair competition," according to Sang Youn Whang, vice-president and technical director of International Communications Corp.

Appearing before the Senate Judiciary Antitrust Subcommittee, Whang charged that "nonethical sales people of telephone companies can call customers and, off the record, tell them, 'if you use our modem we will make sure the lines are good.'" Whang said he wished he could verify this type of practice in writing but "customers are afraid to complain lest there be some reprisal."

Hart's Bill

The testimony by Whang was part of an inquiry into AT&T and the communications industry being held by the Senate subcommittee chaired by Senator Philip A. Hart (D-Mich.). Hart has authored an industrial reorganization bill which would set up procedures to eliminate monopoly and oligopoly power in industry.

There is an inclination in Bell's planned DDS network to provide a better quality of line service to customers who get a Data Service Unit from the telephone company, Whang said.

The DDS customer will be able to get a DSU device from a non-carrier supplier but it will not have the same central office remote test capability the AT&T version will have, he said.

"The customers who own their own DSU may not obtain this remote test feature," he said, because Bell claims this test capability is "internal business and there is no need for others to know about this."

'Protect Its Monopoly'

In a discussion on the presently required data access arrangements, Whang said AT&T's claims of potential harm to the telephone network "have been exaggerated and exploited to secure a protected market. The DAA is designed to protect AT&T's monopoly rather than [protect] the public network," he charged.

For a long time users have been crying for a "modular compact coupler" for use with common power supplies at installations which have a large number of DAAs, Whang said. AT&T has found a way to make such modular units within its own data sets but users with large installations need "wall-to-wall DAAs as well as wall-to-wall electrical outlets to

provide power to the couplers."

AT&T engages in anti-competitive practices to sell the data communications equipment made by Western Electric, its subsidiary, Whang said. "The obvious solution is to separate Western Electric and AT&T. No company should be allowed to enjoy a permanent monopoly and ignore public needs," he claimed.

In related testimony, William C. McGowan, chairman of MCI Telecommunications Corp., said AT&T is frustrating the free and fair competition ordered by the FCC two years ago when it approved the specialized common carriers.

AT&T's practices could "endanger the lower costs and better service [that specialized carriers] promise to business

users," McGowan told the subcommittee.

AT&T Long Lines should be restructured as a separate entity so that Bell cannot monopolize both local telephone companies and intercity long distance service, he suggested. The specialized carriers depend on local phone companies for "intracity hookups," but AT&T control over these local operating companies is holding back the efforts of the specialized carriers to establish service, McGowan charged.

AT&T Long Lines should be separate and forced to "deal at arms length with the local companies it now controls," McGowan said. He also blamed AT&T for publicity techniques that threaten the user with high rates and "other scare tactics."

High-Speed Analysis -- Part II

ICC, Codex Are Main Vendors

The two main suppliers of 9,600 bit/sec data sets are International Communications Corp. (ICC), Miami, Fla., and Codex Corp., Newton, Mass. The sets are not interchangeable since they use different transmission schemes, but both appear to be reliable and have been operating at user sites for several years.

The ICC 5500/96 is susceptible to line characteristics not spelled out in the tariff. To help users coordinate the necessary lines with their local phone companies, ICC has issued a list of recommendations on parameters that should be monitored. The list is comprehensive and will give the user an insight into the types of line problems that can occur at higher speeds. It is available on request.

The Codex 9600 can be run on lines that meet present AT&T C2 conditioning tariffs, according to the company. Although this means the user will have to familiarize his local data representatives with current private line specifications, no unusual fine tuning is usually required.

Despite the somewhat more demanding line requirements of the ICC modem, some users favor this unit because the company is larger and can usually respond faster when trouble occurs. Also ICC engineers will back up the user with technical expertise and test data to prove to telephone craftsmen that the line is at fault.

But Codex said it can provide "same day service" anywhere in the country and it claims to have better error performance.

A new 9,600 AT&T modem seems to be a sure bet for the future. Although Bell has said nothing officially, the unit could be called the 209 and would include many of the same features (LSI technology and diagnostic indicators) that are

included in the 208 which operates at 4,800 bit/sec.

If a 209 is introduced soon, it will most probably be restricted to private line applications. Most experts feel that 9,600 bit/sec on dial-up lines is still several years away.

One user who has been operating at 9,600 bit/sec "for several years" said the T1 carrier system used by Bell is "death" to some high speed data sets. "We try at all times to avoid routes which have a T1 carrier. But since this is their primary carrier system it creates a problem," the user said.

Asked why the T1 system created a problem for some data sets, the user said certain compandor characteristics cause operational problems and the line can be "too flat without any undulations." Modems with phase keyed modulation techniques and automatic equalization can be troubled from flat line conditions, the user said.

"The phone company doesn't recognize these types of things, they recognize only 3002 lines with C2 conditioning so when you talk to them about these problems they are very, very unsympathetic," he added. "Bell will go as far as they have to under the spec, and they will go no further," he said.

"We have been able to transmit at 9,600 within this difficult environment by building diagnostics into our system and doing a fantastic brainwashing job on our Bell data representatives," he said. "Now when we tell AT&T that we have a line problem they have a tendency to believe us and they double check their own equipment." But the official Bell position is that as long as it meets the spec, they are doing their job, the user said.



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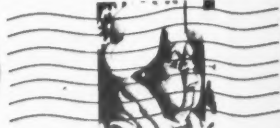
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I hate to tell you, Ma, but the VA3400 can be used in Vadic's Multiple Data Set or standalone units which have analog and digital loopback, display of all EIA interface signals, built-in 300 and 1200 baud test signals. It can also be used with any of Vadic's automatic dialers.
The price? Better sit down, Ma. Just \$750, with OEM discounts available.
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WU Adds KSR

MAHWAH, N.J. — Western Union Data Services Co. will soon offer a version of the GE Terminus 1200 KSR teleprinter, but the Data Services version will be set on a pedestal and will lease for less, according to a Data Services spokesman.

The EDT 1200 KSR terminal transmits and receives data at 10 char./sec, 30 char./sec and 120 char./sec, switch-selectable in serial form.

The teleprinter's standard four-row keyboard can generate all 128 ASCII characters, both upper and lower case. The unit has a 120- or optional 80-print position line length, with automatic carriage return.

The EDT 1200 comes with an EIA standard RS-232 plug, and for systems operating in half-duplex, an optional feature provides an interface with a 202C data set or its equivalent.

Excluding the modem, the EDT 1200 KSR in an EIA arrangement costs \$165/mo on a one-year lease, or \$185 for a minimum 90-day lease. The first price compares with a GE price of \$206, according to a Data Services spokesman.

Deliveries will begin in September from 16 McKee Drive, 07430.

Mohawk Software Boosts Remote Entry Stations

UTICA, N.Y. — Mohawk Data Sciences Corp. has introduced two free software packages that enhance the remote communications input capabilities of its key entry systems.

The Mohawk Synchronous Communications (MSC) package allows remote key entry stations to transmit batched data directly to a Mohawk 2400 network controller, thus eliminating the need for a key entry device at the central site to receive data, a spokesman said.

Single-, Dual-Line Control

The MSC software together with the programmable 2400, allows either single- or dual-line control to receive incoming data at speeds up to 2,400 bit/sec over dial-up facilities. Although the 2400 must operate in an attended mode, the remote key entry devices can be dialed while unattended.

A 2400 controller equipped for single-line control with the MSC package costs about \$860/mo. Dual-line control, available in November, would add another \$225/mo, the spokesman said. Data received at the central site from remote key entry stations is batched onto tape and then transferred manually to the host CPU tape drives.

The second software offering includes two communications emulators that allow high-speed transmission of data between 2400 controllers. The package allows binary synchronous transmissions up to 9,600 bit/sec using the protocol of the IBM 2968 tape transmission terminal.

The package, available now, allows data transmission to operate concurrently with high-speed off-line printing. Mohawk also introduced a software package that enables the 2400 to emulate an IBM 360/22 Hasp remote workstation. Using this package, the 2400 accepts multiple card readers, punches, printers and mag tapes. The Model 22 capability will be available in November.

TTY Acoustic Cover Can Cut Noise 90%

CITY OF INDUSTRY, Calif. — Van San Corp. is offering an acoustic cover which can reduce the noise from a Teletype 33 ASR or Telex 32 ASR by between 60% and 90%, according to the firm.

The Model 1111 costs \$219.50. Delivery is 45 days from stock at 1180 Centre Drive, 91748.

frequency division multiplexer

FEATURES...

INDICATORS: Multi-colored display panel provides indication of four control and two data functions.

MULTI-DROP: Drop one or more channels at a number of locations.

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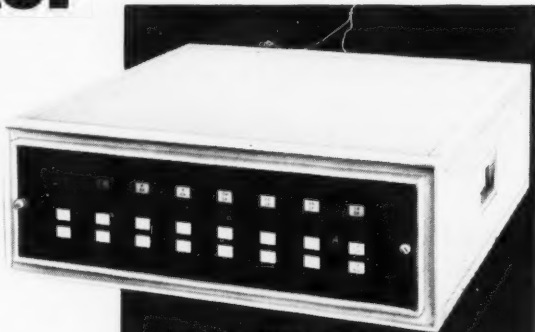
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DATA RATES: Mix 110, 150 and 300 baud channels.

CONTROLS: Processes all modem control functions.

VOICE-PLUS-DATA: Simultaneous voice channel with four data channels.

OPTIONS: Many other optional features.



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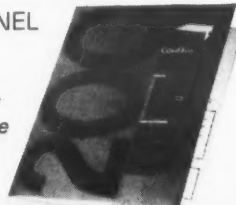
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Bits & Pieces

HP Users Get 2.4M Byte Disk Memory System

HAYWARD, Calif. — Hewlett-Packard 2100 computer users can obtain a disk memory system from Digimetrix, Inc. with a storage capacity of around 2.4M bytes.

The Model 700 is composed of a fixed and removable 5440 disk cartridge. Average access time for a random seek is 35 msec.

The controller provides the DMA interface and requires two I/O slots in the HP mainframe. It features read-before-write address checking, double-word buffering, error checking, hardware/software write protection and multiple disk seek overlap.

Total subsystem price is \$7,700 from 20698 Corsair Blvd., 94545.

First IBM DAT Box Installed

CHICAGO — The first IBM Dynamic Address Translation (DAT) box has been installed at Montgomery Ward's computer facility here.

The DAT box is being attached with the intent that if all goes well more DAT boxes will be obtained for the firm's other batch-oriented 370s.

The DAT box is used with either the 370/155 or 370/165 to provide the hardware necessary to operate in a virtual memory mode.

Printers Designed for Mini Users

FULLERTON, Calif. — Two 132-column printer systems have been announced by Media III, for use with mini-computer-based systems.

The Model 2311 is a 125 line/min printer. Its companion offering, the Model 2312, is a 200 line/min printer. Interface equipment and cables are included.

Prices for systems range between \$4,895 and \$5,795, dependent upon computer and system configuration, from the firm at 2454 E. Fender Ave., 92631.

Process Control Looks to Fortran

PRINCETON, N.J. — A process control computer from Metromation, Inc., is designed for ease of use by having all user programs written in Fortran.

As backup to Fortran programs, a large set of precoded service facilities relieves the user of the task of writing code to acquire, condition, convert, store and output data.

A fill-in-the-blanks facility is used to establish and modify alarm limits, sources and destinations for data, report formats, instructions for data conditioning and conversion.

A basic configuration includes the CPU with 32K words of memory, card reader and console. A variety of interface options is available which together with additional peripherals, operators' consoles and alarm status panels can be tailored to requirements of specific process applications.

Typical systems cost around \$70,000 from 1101 State Road, 08540.

Power System Protects P/C Users

SAN DIEGO — The 3 kVA "Mini-Ups" is a low-cost uninterruptible power system for protecting instrumentation and process equipment against power loss.

The system is available from Topaz Electronics and will operate on power lines of 95 to 130 Vac. Each unit is packaged with battery charger, inverter and choice of either relay or solid-state transfer switch. Integral meters show battery voltage and output voltage.

Prices for the Mini-Ups start at \$4,400 from 3855 Rufflin Road, 92123.

Extra Income, Full Compatibility

1130 Replacement Comes With Bonuses

By Michael Weinstein
Of the CW Staff

GREENSBURG, Pa. — "For only a 25% increase in monthly rental we were able to get a replacement for our 1130 Model 2 that is four times as fast (in the worst case), has double the disk storage capacity and allows us to run applications previously impossible," stated Gene James, DP manager of Overly Manufacturing.

"Further, the increased capabilities of our Digital Scientific Corp. (DSC) Meta 4 have allowed us to rent time to two colleges, a retail shoe chain and a steel maker. These rentals result in \$35,000 which almost pays for the new system," James said.

When James first arrived at Overly in 1970, the firm had a programming staff of one manager and two programmers. The computer system consisted of a 16K-word 1130, a disk subsystem composed of three 2310s (3.6M byte total storage capacity) paper tape equipment, plotter and a printer.

Eighty percent of the system workload dealt with standard business operations such as accounts payable or receivable, inventory, etc. The other 20% involved specific engineering applications used in the production of doors, swimming pools and the top of the Astrodome, James said.

The principal computer language was Fortran which made use of the IBM commercial subroutine package.

Soon after James' arrival, the firm acquired another company and so the 1130 became expendable.

As an interim step, James traded his IBM disk subsystem for a Memorex 2311-type subsystem with an 1130 interface. For slightly less the firm bought 6.2M bytes of on-line storage which gave it time before a more permanent solution could be reached, James noted.

Avoid Conversion Problems

The object was to find a machine that offered the newer and faster speeds and cost advantages but would not create conversion problems when the firm tried to move over, he remembered.

"Our options soon boiled down to a General Automation (GA) 1830, an IBM 360 or DSC's Meta 4," he said.

The GA 1830 was not an easy machine to use, James said, and would have been difficult to leave in the hands of the standard computer operator. Bootstrap loading was especially arduous, he said.

Further, GA did not have a total IBM software compatibility. It took IBM software, did some work on it so it would operate on the 1830 and then re-released it to the user.

While there was no charge, this IBM-to-GA-to-user operation meant "that some software available from IBM might take two years to get to us," James said.

Avoid 360s

The alternative of moving into the 360 series was discarded because of the heavy reliance on Fortran. "We felt that using 360 Fortran was atrocious for business applications and its continued use on the 360 would degrade that system. We did not want to, nor could we, undergo the process of rewriting all of our programs," James noted.

At this time, James turned to the Meta 4 and found that everything on his 1130 would run on the DSC computer with no conversion needed. In the worst case, the Meta 4 ran jobs four times as fast as the 1130 and in some cases as much as 25 times as fast, James indicated.

The inclusion within the Meta 4 of floating point and microcoding worked to speed one application dealing with door design from a previous 1130 time of two hours to a Meta 4 time of five minutes, he said.

The configuration consisted of the central processor with 16K words (16-bit word) of memory, 75 card/sec paper punch, IBM 1442 card reader/punch, IBM 1403 line printer, IBM 1627 plotter, two magnetic tape drives, the Memorex 3610 disk subsystem (6.2M byte), a Calcomp DS12 disk subsystem (25M byte) and eight communications lines.

This system rents for about \$4,300/mo compared with \$3,500/mo for the 1130 used in 1970.

Because of the Meta 4's compatibility with the 1130 all that was needed to move the IBM peripherals over was to unplug them and move them across the room and plug them back in, James said.

To augment software, James obtained a printer spooling package from DNA Systems and contemplates getting another package designed for the 1130 (which will work unaltered on the Meta 4) to enable multijob stream operations.

"It is the speed of the computer combined with the communications capabilities that have allowed us to offer some of our programs and time on our computer to outside firms," James said.

"This effort has brought in enough money to almost pay for the system and in no way has acted to impact the internal needs of our firm," he concluded.

More Memory, Communications Highlight New IBM System/7

WHITE PLAINS, N.Y. — Four times the memory, three times as many I/O sensors, optional binary synchronous communications and stand-alone programming capability have been added to the IBM System/7 to boost the computer's ability to perform sensor-based applications.

New memories range in size from 16K to 65K words (16-bit word) in 4K-word increments. The previous memory limit for the System/7 was 16K words.

Use of bipolar circuitry in the memory construction gives each new chip eight times the capacity of previously available memory chips. Thus, the addition of more memory will not create added space

problems.

The processor provides all the functions of the previous models, a spokesman said, including a 400-nsec storage cycle time. A new hardware feature is the storage protect capability, which prevents changes from being made to data or programs stored in user-specified memory segments.

Moving away from the processing unit, new I/O modules allow users to attach up to 384 analog sensors — triple the number previously handled.

The binary synchronous communications adapter (BSCA) allows users to communicate at speeds up to 50 kbit/sec with another computer having the BSCA feature.

In a typical operation using the BSCA, a remote S/7 could communicate with a centrally located large computer to input data on field operations.

To augment the S/7's ability to function as a satellite processor, IBM is offering program preparation facilities previously only available on a host computer.

A new version of Modular Systems Programs/7 (MSP/7) includes a real-time facility called Simultaneous Disk Services that permits users to enter or retrieve data from disk while the S/7 is executing an applications program.

Users can write their own programs in either Fortran IV or Application Module Language (AML/7). Programs written in either of these languages will operate with MSP/7, a spokesman said.

Monthly rental for a typical system including a processor with 16K words of memory, a sensor I/O module, a disk module and a 5028 operator station will be about \$1,600/mo. Purchase price for the same system will be about \$64,000.

Additional 4K-word memory increments rent for \$135/mo or can be purchased for \$4,725.

First user shipments of the new version of MSP/7 are scheduled for December of this year. Fortran IV will also be available in December at a monthly rental charge of \$80. AML/7 will be available starting in March of next year for a one-time charge of \$600.

Simplified Design Reduces Printer Cost

HUDSON, N.H. — Lower cost and easier maintenance is the advantage of Centronics' new 165 char./sec printer, according to the firm.

The architectural difference between the new Model 101AL and the previously announced 101A is the newer unit makes use of LSI (Large Scale Integration) and thus is comprised of fewer printed circuit boards.

Five boards used on the 101A (three electronic and two power supply) have been replaced by one board on the 101AL.

Operating specifications between the two units remains unchanged. Both are 132-column serial, impact printers with printing speeds of 165 char./sec. This equals a speed of between 60- and 200 line/min, the firm's spokesman said.

Individual characters are produced using a 9 by 7 dot matrix. Interfaces for most minicomputers as well as communications (up to 9,600 bit/sec) interfaces are available as options.

Various character sets are available including foreign and other character sets including upper and lower case as options.

Price of the 101AL is \$4,030 which is \$100 less than the 101A from the firm at One Wall St., 03051.



168 Arrives

Electronics package held by Diane Pelham is part of the memory of the first 370/168 to be installed at a user's installation — Chicago headquarters of Standard Oil Co., (Indiana). Even though the 168 is the most powerful computer in IBM's line of virtual storage systems, this first installation is expected to see most of its action in more conventional operations. "It will be about four years," noted Frank Pearce, general manager of information systems and management science, "before we convert to virtual operations." The new 168 is about four times as fast as the previously installed 155, he added.

Shhhhhhhh

Here's the best-kept secret in the data processing industry:

There is an intelligent terminal system that can stand alone without technical personnel, and handle up to 20 workstations simultaneously. It's remarkably effective for the price. System Ten* computer by Singer.



*A Trademark of The Singer Company

And it's already installed in all of these industries.

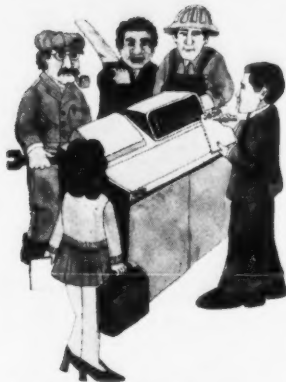
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Construction Other Than Building
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Mfg—Textile Mill Products
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Mfg—Lumber & Wood Products
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Mfg—Paper & Allied Products
Mfg—Printing & Publishing
Mfg—Chemicals & Allied Products
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Mfg—Rubber & Miscellaneous Plastics
Mfg—Stone, Clay, Glass & Concrete Products
Mfg—Primary Metal Industries
Mfg—Fabricated Metal Products
Mfg—Machinery, Except Electrical
Mfg—Electrical Machinery & Equipment
Mfg—Transportation Equipment
Mfg—Photographic & Scientific Instrmnt
Mfg—Miscellaneous Mfg Industries
Motor Freight Trans & Warehousing
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Transportation Services
Communication
Electric, Gas & Sanitary Services
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Building Material, Farm Equip Dealers
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New S/3: A Software Release?

By Michael Weinstein
Of the CW Staff

Without detracting from the potential user benefits of IBM's newly released System/3 Model 15 [CW, July 18] it is safe to state the new computer is primarily a software release.

Major hardware components, central processor, memory and disk subsystem remain unchanged in operating specifications. The only hardware moves (more main memory and more disk) seem designed solely to take advantage of new software.

This software allows users to run multiprogramming operations more efficiently, perform communications operations that can lead to a form of networking or satellite processing and the ability to attach faster peripherals.

The need for the added main memory becomes evident when one considers that the supervisory software for these improved operations can take up to 40K in resident memory. On the largest IBM suggested Model 10 (48K bytes of main memory) implementing this software would only leave 8K bytes for processing.

Of this 40K resident requirement, 18K bytes are used for general system operation controlling the added memory, added disk storage, communica-

tions and faster peripherals.

To take advantage of improved multiprogramming users must add about 20K bytes supervisory software in the form of the

sophisticated user could obtain the software and extra memory for his mainframe could he not perform the same functions without paying as much added money in terms of an upgrade?

The answer is probably a qualified yes, in that the sophisticated user could do these things, but it is unlikely that he will get access to the software portion of the mix.

What IBM might be saying is if you like our new software, then you've got to like our new model.

Analysis

Communications Control Program (CCP). It is this program that allows users to further subdivide memory into smaller partitions for the multi-job runs.

These observations lead to an interesting hypothesis: if a

Tape Drives IBM-Compatible

MELVILLE, N.Y. — IBM 360/370 users can obtain tape transports at savings up to 25% over the lease price of equivalent IBM tape drives, according to a spokesman for Potter Instrument Co.

For example, a subsystem composed of four Model SC3425-1s and controller (with dual density and full maintenance coverage) will cost \$2,104/mo on a two-year contract from Potter compared with \$2,595/mo for equivalent IBM equipment, a spokesman said.

The Potter series includes four

models (SC3423-1, SC3425-1, AT3423-1 and AT3425-1) which operate with the Potter TC5805 controller in a single density, 1,600 bit/in., 9-channel mode. A dual density option is also available.

A major feature of the Potter transports is radial cabling of both signal and power cables to permit the user to take a single drive off-line without disrupting real-time system operation, the firm said.

Delivery is 60 days from 532 Broad Hollow Road, 11746.

Potter Tape Drive Model	Data Transfer Rate (kbyte/sec)	Purchase Price	Monthly Lease Price (Two-year lease)
SC3423-1	120	\$ 7,900	\$205
SC3425-1	200	\$ 8,300	\$220
AT3423-1	120	\$ 9,100	\$230
AT3425-1	200	\$ 9,500	\$245
TC5805 Controller		\$15,000	\$420

Price Chart of Potter Tape Drives

For Hardware Designers

Monitor 'Photographs' Data

By Marvin Smalheiser
CW West Coast Bureau

IRVINE, Calif. — A device called an "Assemulator" which is said to be capable of showing the instruction execution occurring inside a processor has been announced by the Microelectronics Division of Rockwell International Corp.

The Assemulator was created as a design aid for equipment manufacturers using predesigned MOS/LSI microprocessor circuits and microprogramming to create unique models of smart terminals and complex calculators.

It is called an Assemulator to describe its primary functions of microprogram assembly and simulation.

It handles direct inputs from and outputs to an ASR-33 teletypewriter, or it can be used with the teletypewriter as a terminal to develop microprograms with the aid of a computer program.

The Assemulator was designed for Rockwell by Applied Computing Technology (ACT) for applications of the Rockwell MOS/LSI Parallel Processing System (PPS).

Lights on a front panel make it possible to "take a snapshot of data on the data bus at the address location established by the operator," explained William E. Wickes, product development manager for Rockwell's Micro-

electronics Division.

Functionally, the Assemulator consists of a firmware program in a silicon-on-sapphire (SOS) read-only memory (ROM) controlling assembly and simulation and editing through an MOS/LSI CPU which then becomes the controlling CPU during actual program operation.

For complex machines, the designer can use Rockwell's assembly and simulation program for microprogramming, which is available through the Tymshare network.

The assembled program is dumped onto punched tape at the teletypewriter, and in turn loaded into the Read-Write Memory (RWM) of the Assemulator.

Rockwell said the equipment has outlets permitting synchronizing of an oscilloscope with the address and/or data bus lines to obtain displays of specific signals.

The basic Assemulator (Model PPS-4MP) consists of chassis, power supply, interconnecting cables, control program in SOS ROM, teletypewriter interface, 16 PPS RAM circuits providing 2K by 8 RWM, PPS CPU circuit, PPS crystal controlled clock with power-on initialization, four PPS RAM circuits providing 1K by 4 data storage, one PPS I/O circuit which with the CPU provides five 4-bit parallel input and four output ports.

This model sells for \$6,950.



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Reactions to DP Seminars Sought for Rating Guide

By Frances D. Smyth
Special to Computerworld

An increasing number of firms, colleges, universities and not-for-profit organizations now offer DP seminars of from one-day to several weeks. User technical

Viewpoint on Education

staffs are literally inundated with literature on new offerings; it is not uncommon for one day's mail to bring a dozen or more announcements. And telephoned followups are becoming frequent as well.

These seminars are often uneven in quality and presentation and we are put in the position of buying an item blindly. Not only is this a poor practice educationally but at today's prices it's a costly experiment.

At a time of reduced budgets — which is what many of us are encountering now — it doesn't take too much bad luck to exhaust the education fund without real payback.

I propose a group which would actively review DP courses and publish their opinions. Needless to say, a given class can be rated very differently by each of its attendees, and no one should take an opinion as an objective fact.

However, when an intelligent fellow professional finds little of value in an offering, I for one would not gamble my money on attending, in the hopes the rating/opinion was completely inaccurate.

There should, of course, be some standard ingredients in a rating, some "cook-book" way of assigning a value to a course. My list of factors would include the following without, for the moment, going into how each category might be rated:

- Accuracy of information.
- Completeness of information.
- Clarity of presentation.
- Depth of material.
- Documentation of data sources.
- Physical facilities.
- Availability of instructors for questions.

• Fellow attendee interchange (often a very valuable part of a class).

I confess to finding the choice of media used relatively unimportant — providing what is used is of value. A stand-up

DPers Study Banking In Institute at UCC

DALLAS — DP is vital to banks, but many DPers don't understand what banking is really all about, according to spokesmen for University Computing Co. (UCC) which recently set up the Banking Institute to bridge that particular "communications gap."

Not to be confused with the long-established Bank Administration Institute, the new course on banking concepts requires three two-week sessions "in residence" here, separated by two 10-week periods during which students work at their own installations on projects assigned by the UCC faculty.

The institute was established, UCC said, to aid its own personnel in their work with client banks. But it is also open to staff members of client banks on invitations of the institute's advisory board, made up of both bankers and educators.

The institute teaches bank operations, administration and management concepts to marketing, development, operational and executive personnel.

Students will use the computer-based Stanford Banking Management simulator to model the decision-making process of a bank over a simulated period of two years.

UCC is at 7200 Stemmons Freeway, P.O. Box 47911, 75247.

lecturer who knows what he is talking about, and is talking to the subject at hand, is of far more value than elaborate audio-visuals which prettily say nothing. I'm not anti-media, simply tired of gimmickry for its own sake.

People Not Things

And as long as physical facilities do not interfere with the educational process, I'm not impressed with a better hotel or a more elaborate luncheon. But I am unhappy with the organizers of a seminar who don't get to the training site early enough to insure that things are in readiness before the attendees arrive.

If there are enough other people interested in the project, I'd like to see an independent group started, with the specialized goal of publishing an educational offerings rating, so that solid ac-

Your Experience?

I recently attended a seminar titled _____

held in _____. It lasted _____ days

and was sponsored by _____

I'd rate it _____

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Readers interested in reporting their experience can send this coupon to Frances D. Smyth, MCIT, Kennecott Copper Corp., 161 E. 42nd St., New York, N.Y. 10017.

complishments could result from clearly directed efforts.

Such a group would have to be on its own. Too many of the existing DP organizations are already involved in their own educational presentations and I'd want no conflict-of-interest possibilities to get in our way.

Readers interested in the formation of

such a group can send in the attached coupon or contact me directly. Let's see what a group of people interested in quality data processing education can do to further that goal.

Smyth is in the Management Controls and Information Technology (MCIT) group at Kennecott Copper Corp. and an instructor at New York University.

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Workshops Scheduled

SMIS Looks at Decision-Making Process

CHICAGO — "The Management Decision-Making Process — More Than Information Systems" will be the theme of the Fifth Annual Conference of the Society for Management Information Systems (SMIS), to be held Sept. 13-14 at the Sheraton-Chicago Hotel.

On Sept. 12, SMIS will conduct a series of all-day work-

shops including "Human Factors in MIS Design," "Management of the Overall MIS Activity," "MIS Design Strategy" and "Computer Systems of the Late 1970s — Their Implication for MIS."

Societies/ User Groups

The conference program is structured to cover both technical and general experience sessions, emphasizing interaction

between the user (management) and the designer (MIS professional) in defining the management process.

Three major conference subjects have been established: identification of the decision-making process; support systems to the decision-making process; and experience in implementing the various types of decision-making systems.

Thursdays sessions will include "New Computer Technology to Be Applied in the Decision Process," and "Real-time Needs in the Decision Process," as well as two discussions of human resources for MIS, one on the skill profile of current practitioners and one on the education of future practitioners.

New management science tools and the forecasting effect of outside influences on decision-making will also be covered.

Further information is available from the Society for Management Information Systems, 221 N. La Salle St., 60601.

Executives to Study Data Communication

WASHINGTON, D.C. — "Data Communications — The Executive Imperative" will be the focal point of a two-day ICC Institute seminar, to be held Sept. 10-11 at the Marriott Key Bridge.

The course objective is to increase familiarity with basic terminology used in the data communications field, to introduce tariff and cost-saving measures and to develop an understanding of how transmission problems affect the system.

A discussion of classified terminal performance will explain the differences between systems from the standpoint of economics, and by definition, between CRTs, teletypewriters and remote stations.

Multiplexing and data concentration with a view to increased efficiency and cost reduction will be considered.

The seminar will also investigate the question, "What to Do When Your Company Outgrows Its Present Data Communication System."

Fee for the course is \$300. Further information is available from Dorothy Buckley, Administrative Coordinator, ICC Institute, 7620 N.W. 36th Ave., Miami, Fla. 33147.

Society Happenings

ACMers Figured Out

NEW YORK — The Association for Computing Machinery (ACM) has compiled figures on its membership.

As of June 30, 1973, ACM has 22,363 individual members, of which 2,469 are associate members. In addition, there are 6,312 student members.

A breakdown of SIG/SIC membership distribution revealed a total of 2,188 members for the SIGBDP group. SIGOps and SIGPlan have 3,212 and 3,421 members respectively, making them the largest special interest groups.

IEEE Nominations Set

NEW YORK — John J. Guarrera, president of Sacom, has been nominated for the 1974 presidency of IEEE. He is presently serving as vice-president of the institute.

Dr. John D. Ryder, retired dean of the school of engineering, Michigan State University, has been nominated for the position of vice-president.

The Name Has Changed

LA JOLLA, Calif. — Simulation Councils is marking its twentieth anniversary by adopting a new name: The Society for Computer Simulation (SCS).

However, the society is retaining its corporate name, Simulation Councils, Inc., for legal and business purposes.

Academic Computing Directors Meet

BOULDER, Colo. — More than 100 computer experts from the U.S., Canada and Israel are expected Aug. 19-22 at Snowmass at Aspen for the fourth annual Seminar for Directors of Academic Computing Services, hosted by the University of Colorado.

The seminar is designed for senior management personnel of computing service centers at institutions of higher education.

The seminar will include technical presentations on management decision-making, manage-

ment auditing techniques and processor-on-a-chip technology.

Participants also will take part in discussions about academic computing policy standards, personnel classification, state EDP control, administrative system and sharing.

Registration fee is \$150 for the first campus participant and \$100 for each additional campus participant. Further information is available from E.R. Krueger, University Computer Center, University of Colorado, 80302.

The Computer Users' Forum and Exposition, English-style

You're invited to see the latest EDP equipment and services during our Computer Caravan tour of the United Kingdom in September.



We extend a hearty invitation to our English and European readers to visit the English Computer Caravan during September. You'll find the user-oriented forums and workshops to be of immediate, practical use—and you'll see the latest EDP equipment and services at our exposition.

Here's the schedule:

City	Dates	Location
Manchester	Sept. 3-5	New Century Hall
Birmingham	Sept. 11-13	Great Hall, University of Birmingham
Edinburgh	Sept. 18-20	MacRobert Pavilion
London	Sept. 25-27	Europa Hotel

Advance registration is not necessary for the exposition, but is advisable for forum attendees. If you'd like further information, contact:

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CI Notes

'Loose Ends' Stall ISS Deal

NEW YORK — Citing the need to "tie up loose ends," and complete "certain fact gathering," Sperry Rand Corp. Chairman J. Paul Lyet disclosed the firm has deferred the closing of the planned purchase of Information Storage Systems.

While the transaction was originally cited for July 31, Lyet said the company had suggested a 30-day delay, but could complete the purchase sooner.

Although he said the problems were minor, they included a desire to clarify any possible antitrust questions.

IBM's GSA Award Declines

WASHINGTON, D.C. — The General Services Administration renewed its Federal Supply Schedule contract with IBM, but for \$200 million, about 20% less than last year's.

The principal reason for the decline in this as well as other schedules for DP firms, a GSA spokesman noted, is the increasing volume of separate contracts.

Ten Suspects Indicted

SAN JOSE, Calif. — Ten suspects charged with conspiring to steal IBM secrets worth \$660 million have been indicted by the Santa Clara grand jury.

The suspects were arrested June 29 and all have pleaded innocent to charges against them. The trial is set for Sept. 24.

The grand jury indictment contained a total of 22 felony counts related to IBM's 2314, 3330 and 3340 disk drives.

Univac Protest Disallowed

CW West Coast Bureau

SACRAMENTO, Calif. — The protest filed by Univac charging that the bidding requirement for the Stephen P. Teale consolidated computer center favored IBM has been disallowed.

"We intend to pursue our protest by whatever alternatives are available to us. We did not do this (the protest) as obstructionists but as a concerned corporate citizen," commented T. Malcolm Hill, Univac branch manager.

The decision on the protest was rendered by G. Lee Smith, the state EDP officer in the department of finance.

Lockheed Counters DEC Suit

LOS ANGELES — Lockheed Electronics Co., Inc., named in a patent infringement suit filed by Digital Equipment Corp. [CW, Aug. 8], has filed a declaratory judgment action against DEC in U.S. District Court here.

The Lockheed action contends the DEC suit was filed without good cause and seeks an injunction against DEC maintaining its present suit or any other suit for infringement of patent No. 3,710,324.

Lockheed's suit further asks a declaration that DEC's patent on single bus control techniques is invalid and not infringed by Lockheed's Sue minicomputer.

Supershorts

Orbis Systems, Inc. has been formed by a group of former engineering and manufacturing managers from Century Data Systems to manufacture low-cost magnetic recording devices and systems, including flexible disk drives, for the OEM market.

Hewlett-Packard has shipped its 6,000th minicomputer to Allen-Bradley Co. The Data Systems Division has increased its shipments by 50% in little more than one year, according to HP.

Periphonics Corp.'s system shipments for the first half of 1973 were up five times over the same period last year and represented almost twice the total shipments for all of 1972, the firm said.

Economist's Viewpoint — Part I

Alternate IBM Restructuring Proposed

By E. Drake Lundell Jr.

Of the CW Staff

CAMBRIDGE, Mass. — Both the technical and economic performance of the U.S. computer industry could be improved dramatically if IBM were broken up, according to a recent economic analysis of the industry over the past 20 years.

Dr. Gerald Brock, who wrote the 500-page study as his dissertation for his doctorate in economics from Harvard, concluded that while the performance of the industry over the past 20 years "has not been bad as a whole," it could be improved "through structural changes."

This is the first of a two-part series on the structure and proposed restructuring of the DP industry. The second article will examine barriers to entry into certain segments of the industry.

Brock, however, favored changes in IBM that are quite different from those recommended by the Justice Department in the government's present antitrust suit against the firm.

He recommended restructuring IBM into four separate companies — one handling peripherals manufacturing and marketing, one for maintenance, one for the development of CPUs and operating systems and a final one for leasing, education, consulting and software services.

The goal of his plan, he said, "is to

preserve efficiency by allowing the organization to stay intact in areas where there are large economies of scale, but to restore free competition where the technical conditions are conducive to competition."

The breakdown was based on economic considerations, he noted, in that it would allow the company to remain united in areas, such as software production, where economies of scale are possible but would subdivide it in areas, such as manufacturing, where such economies are not possible.

Under the Justice Department's plan, IBM would be broken into several discrete companies that made a whole range of products, from CPUs to peripherals and software.

The reason for the distinction, according to Brock, is that in solely economic terms, monopoly may be better in certain areas where large economies of scale are possible, and he noted that his study was aimed at determining what arrangement would provide the best economic performance on the part of the industry.

"The existence of economies of scale sets a limit on the number of competitors possible without losing efficiency," he noted, but added his analysis showed economies of scale were virtually nonexistent in all manufacturing areas of the computer business, so there was no economic justification for having the busi-

ness dominated by one firm.

Peripherals Separation Feasible

In the peripherals area he found that "the ability of numerous independent peripherals companies to undercut IBM's price with equal or better performance has shown the feasibility of separate peripheral and CPU production."

This separation of the peripherals operation would serve two basic purposes, according to Brock. First, it would "protect IBM from switching profit back and forth between CPUs and peripherals in a form of unfair competition with the non-integrated suppliers," he said.

Secondly, such a move would "force the publication of interface standards so that all companies would have an equal chance at competing for IBM peripherals," he added.

Competition Would Grow

He noted the IBM peripherals company would be the largest in the world at first, but said that barriers to entry into the business would be low and that competition would easily whittle IBM's share down to acceptable levels.

"The efficient independents should have no trouble competing with the former IBM peripheral operation so long as no favored treatment was shown," he said.

With the maintenance operation split off into a separate company, "IBM would then be required to provide parts and information on an equal basis to all maintenance companies," he noted.

Furthermore, Brock recommended that the CPU and operating system production should be separated from the leasing and applications software operations of the firm and that the CPU organization should be allowed only to sell CPUs.

"There would be some advantage to breaking the CPU production from the operating system production," he noted, but added that "it seems infeasible because of the potential coordination difficulties involved."

CPU and operating system development are necessarily intertwined, Brock stated, and it would be difficult to interchange specifications between several independent companies.

In addition, the CPU and operating systems organization should be required to provide the operating systems on the same basis to all others including competing CPU manufacturers, he said.

The fourth and final company in the Brock plan would be the major company in the eyes of many users, he said.

"It would purchase CPUs, operating systems, peripherals and maintenance services, either from the IBM companies or independents, and lease them as a package or individually to final customers. It would write software packages, including perhaps operating systems or enhancements, and sell or lease them."

'Barriers to Entry' Worse

The economic basis for Brock's plan "is that barriers to entry are more significant in harming economic performance than concentration," Brock said, indicating his proposal would eliminate many of the barriers to entry in the business, thus promoting stronger competition.

As an example of this phenomenon, he noted there "appears to be more intense competition in the 'IBM peripherals' market where IBM's share is 90% to 95% than in the general CPU market where IBM's share is approximately 70%," due to the ease of entry of firms into the peripherals marketplace.

"The plan," he concluded, "is designed to provide opportunities for free competition by reducing the requirement for integrated production, while not forcing companies to be inefficiently small."

Japanese Makers Expect Good '73 With Sales Nearing \$2.7 Billion

TOKYO — Strong sales gains are expected for many of the big eight in the computer industry here, according to a recent report in *EDP Japan Report*, a bi-monthly newsletter.

In 1972, DP sales for the eight firms totaled about \$1.8 billion, and projections for 1973 place the figure between \$2.6 billion to \$2.7 billion, according to the report.

Rankings of the big eight are expected to stay the same as in 1972, although if Nippon Univac exceeds its projected level for 1973, it could become number four, displacing Nippon Electric Co. (NEC).

In order of DP sales, the eight largest firms in Japan are IBM-Japan, Fujitsu, Hitachi, NEC, Nippon Univac, Toshiba, Oki Electric Industry and Mitsubishi Electric, the report found.

Excluding results from Nippon-Univac and IBM-Japan, the computer divisions of the remaining six mainframe manufacturers sold \$1.14 billion in 1972, up 7.9% over 1971. Computer sales of the six firms in 1973 are expected to be in the range of \$1.8 billion to \$1.9 billion, according to the report.

In 1973, the report said, IBM-Japan, Hitachi, Nippon Univac and Toshiba are expected to post large sales gains, with Hitachi going from \$260 million to between \$269 million and \$308 million, while Toshiba's sales are projected to jump from \$131 million to between \$154 million and \$169 million.

Computer-related sales of Fujitsu and NEC are expected to grow about 10% above those of 1972, with Fujitsu growing from \$365 million to between \$385 million and \$404 million, while NEC's sales go from \$235 million to between \$246 million and \$254 million, according to the report.

Sales projections for IBM-Japan and Nippon Univac denote total sales while the figures for the other firms are for their computer divisions.

IBM-Japan in 1973 is expected to reach \$538 million, while Nippon Univac will be about \$250 million, according to the report.

IBM's figures will be buoyed by deliveries of the 370/125 and 158, which will be produced in Japan, as well as the imported 145 and 168.

Hitachi will be making more deliveries of its new, large Hitac 8800, which has virtual capability and is designed to be competitive with the 370/168.

Nippon Univac will continue sales of its 1106, for which it received orders for 36 units in 1972, and has also begun delivery of the OUK 9700/I, a version of the Univac 9700 for the Japanese market.

Fujitsu is scheduled to begin sales of the large Facom 230-75 in July, and will have to keep selling other models of the Facom 230 Series.

In 1972, five of the six Japanese manufacturers showed gains.

Toshiba gained 36% in DP sales over 1971; Hitachi 8.9%, NEC 7%, Fujitsu 6.9% and Mitsubishi 4.2%, according to a survey.

However, Oki Electric Industry tumbled 11.6%.

Singer, Memorex Cut Off Negotiations

NEW YORK — Singer Co. and Memorex Corp. have terminated negotiations on the proposed takeover of Memorex.

Singer President Donald P. Kirchner said his firm's decision to end the discussions was "based on a failure to arrive at mutually acceptable terms."

Memorex and the Bank of America, the firm's largest creditor, said the termination of negotiations "resulted from the fact that the final proposal made by Singer was entirely different in form and substance from that originally discussed and set forth" on July 6, adding, "Memorex and the Bank of America found the revised Singer proposal completely unacceptable."

In another development, the New York Stock Exchange board voted to suspend trading in Memorex securities and to request the Securities and Exchange Commission to delist the issues.

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Firm Apparently Folds

PGI Universal Controller Inventory Seized

Special to Computerworld
CHERRY HILL, N.J. — The removal of a \$500,000 inventory of computer disks and universal controllers from the closed offices of Peripheral General, Inc. (PGI) here apparently occurred after a court restraining order had been served on the corporation's current president and secretary.

Former President James E. Linnell said he had asked for the order after the firm had closed its doors a week earlier without making any legal provision for reorganizing or closing down.

"We feared that the considerable assets of the corporation might be dispersed, and so both creditors and stockholders could find themselves unfairly treated," he said. "Then, after we obtain legal protection they just go and move the inventory anyway."

Warren Evoy, an attorney acting for Linnell, said the removal, by trucks sent by the First National City Bank of New York, is a clear breach of the New Jersey Superior Court order, which was granted and served on Aug. 1. The removal trucks were seen Aug. 3 and 7.

The apparent collapse of the firm means that the two independents which announced intentions to develop universal controllers have now apparently withdrawn from the direct marketing of such stored program devices.

As well as PGI, a universal controller was announced by International Peripheral & Computers, Santa Ana, Calif., in late 1971. The development work stopped in October 1972 during a change in management.

This leaves IBM apparently unchallenged in the universal controller field. The IBM product, not yet announced, was revealed in the court papers during the Telex antitrust case.

The function of the IBM universal controller is to create "Third Level Products," which, although marketed to separate industries and for different functions, would physically be built from the same set of standard modules, documents indicated. It is believed that the different functions and interfaces necessary would be handled by the specialized programming of the universal controller.

PGI, which had been in the IBM replacement disk controller and drive business for some four years, was ready to enter the GE replacement market early last April.

Problems arose early this year when the difference in profits between the controllers, which have little competition, and the disk drives, which is a highly competitive market, drew suggestions that the firm cut inventory by manufacturing only controllers.

At that time Linnell was forced from the presidency, and was later succeeded by Neil Peter-

mann, formerly an engineering vice-president.

The inventory then stood at around \$500,000 in partly assembled disk drives and controllers, and is substantially the same inventory that was moved out recently. Former employees of PGI said about \$30,000 to \$50,000 in parts was needed to complete the manufacturing of

the systems.

PGI phones were disconnected early last week, and the firm's former attorney, Schader & Harrison, said it did not know who was now representing the corporation.

First National City Bank spokesmen said the bank was investigating the matter, but had no immediate comment.

Contracts

State Dept. Gets 370s

WASHINGTON, D.C. — IBM has received a \$6.7 million rental and maintenance contract from the General Services Administration for two 370/158s for the State Department's foreign affairs DP center here.

Technicon Medical Information Systems has been awarded a contract by New Britain General Hospital to provide DP services, including financial management applications and a real-time medical information system.

Techtran Industries, Inc. has received a contract from Complanco, Inc., for Techtran 4100 cassette terminals.

American Management Systems, Inc. (AMS) has been awarded a contract by the American Association of Retired Persons and the National Retired Teachers Association to main-

tain a computer-based communications system.

Systems Control, Inc. has received a \$1.3 million contract from the Naval Electronics Command to design and operate a computer system to serve in conjunction with the military data and communications network.

The University of Pittsburgh has been commissioned by the Department of Transportation's Urban Mass Transportation Administration (UMTA) to modify a simulation model to accept data obtained from UMTA's "Dial-a-Ride" demonstration.

Data Systems Analysts, Inc. has been awarded a contract by Philco-Ford to provide technical and software support in the design of a software Electronic Voice System for use by the Federal Aviation Administration.

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Berlin	Nov. 20-Nov. 22
Munich	Nov. 27-Nov. 30

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The CDI 1030 is a lightweight, quiet, reliable terminal using a thermal printing technique. It operates at 10, 15 or 30-characters per second and is perfect for time-sharers on the go.

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Soviets Seen Eager for 360-Type Software

By Bohdan O. Szuprowicz

Special to Computerworld

MOSCOW — There is considerable Soviet interest in IBM 360 applications software for possible use with the Riad computers.

This interest underscores the suspicions held by many Western observers that the Soviets and East Europeans are now entering an era comparable to that of the mid-sixties in the West when rapid introduction of computer hardware created a dire need for

programming skills and software which could make the best use of the computers.

The Riad computers ES-20, ES-30, ES-40 and ES-50 all have a Disk Operating System and an Operating System which have been developed by the Russians and are believed to be closely patterned after the IBM 360 operating software.

Although the recent Riad exhibition [CW, Aug. 1] included 120 different peripheral devices manufactured in the participat-

ing Comecon countries of Bulgaria, Czechoslovakia, East Germany, Hungary, Poland and the Soviet Union, there were few exhibits of applications software or of any organizations comparable to the Western software firms.

Questions on Cost

Soviet DP people asked many questions in an attempt to determine how the development cost of an application program is determined by Western software suppliers.

They also wanted to know how the needs for and requirements of a software package are determined at the outset and how it is eventually distributed to the end users.

Soviet officials from the Ministry of Foreign Trade indicated an interest in an evaluation of available IBM 360 software which the Soviet Union could purchase.

However, they indicated that Soviets would only consider software purchases on a single price basis but would be willing to pay a reasonable price based on the cost of development of a particular program.

Productivity

Their interest centers on application packages of value to the Soviet Union in enhancing industrial productivity. Not only high-level language programs will be given consideration but also application packages written in machine language.

The Soviets want to be free to use copies of a purchased pro-

gram in multiple installations without paying additional fees or royalties. Consequently they are interested in identifying software available from those suppliers who are willing to discuss selling their products on a single-price, no-royalty payment basis.

NYSE Replaces 7010 With 360

NEW YORK — The New York Stock Exchange has replaced its eight-year-old drum storage duplexed IBM 7010 and 7750 with dual 360/50s with disk storage.

The acquisition of the new Market Data System — designated MDS II — is in anticipation of future market information needs of the securities industry.

The system could also provide a foundation for the Exchange's participation in a central market system and a composite ticker-tape reporting all trades in listed stocks.

Aussie Terminals

Could Be 'Competitive'

Special to Computerworld

SYDNEY, Australia — There is no reason why Australian computer terminal manufacturers should not be able to export their products to Europe, according to a visiting British consultant, D.A.E. Maclaren.

Noting there is tremendous inflation in Europe, he said he did not see why Australian companies should not be cost-competitive in the terminal area.

London's Lloyd's Leases 360/40s

LONDON — Lloyd's of London has installed two used IBM 360/40 computers, each with 256K of memory, replacing a 360/30 with 64K and a 360/40 with 128K. The computers were supplied by Promodata Ltd., and have been leased through Channel Leasing Ltd. The machines are being used to handle administrative work involved in insurance underwriting.

Computer Management Group, a service bureau in Great Britain, has ordered five systems valued at \$4.3 million from Burroughs Corp. The order includes two B 4700s, two B 1700s and a B 2700.

The Netherlands Ministry of Finance has ordered a \$10 million system based on dual Model 6080s from Honeywell, Inc. to assist in assessing and collecting taxes.

Revillon, the French fur-to-banking organization, has installed an NCR Century 200 for

commercial and banking applications.

Shell Research Laboratory, England, has installed an Inston

Foreign Orders & Installations

System 2430, which incorporates a Digital Equipment Corp. PDP-11 minicomputer. The system will be used to control a series of tests on the properties of plastic materials.

Technischer Überwachungsverein Rheinland, a West German technical organization, has ordered a Univac 1106 to be used in compiling activity and performance reports, accounting and payroll applications.

South Sea Bubble Co., Ltd., England, has ordered an NCR Century 100 to handle stock control and monitor order processing.

Here's what you always wanted to know about your IBM 370.

Never before has so much confidential information been available to the computer user.

Thanks to actions in Federal Court, IBM's internal papers on its IBM 370 have been brought to light. These "Greybooks" contain a wealth of previously unavailable information on the various models of the 370 — including detailed plans for last year, next year, and every year through 1980. Even IBM salesmen haven't seen most of it. And it can be an invaluable planning tool for any computer installation.

Now these Greybook reports are available to you — in clear, easy-to-read book format — with a page-by-page commentary by the well-known, user-oriented columnist, Alan Taylor.

Almost every page has some information that will help your installation. Alan Taylor's commentary, spotlighted by a specially designed format, provides additional relevant information, and helps make each volume into a practical, useful tool for everyone concerned with the 370. As user, manager, controller, programmer, planner or salesman, there is something here for you. You need a copy of one or more of these books for your professional purposes — and you will want your colleagues to have their own copies so that you can work together.



The facts in these books are fascinating. Among other things they contain are:

- IBM's own analysis of the advantages and disadvantages of 370 models against the competition. (Your Software and Hardware experts both need this information.)
- The descriptions of the planned enhancements for System 370's — and the dates involved. (Your Financial man needs this to help with Rental/Purchase decisions.)
- IBM's plans for the 'death' and replacement of 370 models — and data about their successors. (A unique feature that everyone should read and understand.)
- IBM's use of error-containing hardware for part of the 370 line — hardware that was supposed to be scrapped.
- And much more.

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CMC Will Upgrade Transamerica's Units

SANTA MONICA, Calif. — Computer Machinery Corp. and Transamerica Computer Co. have modified an agreement whereby CMC will upgrade much of Transamerica's CMC inventory.

This program should also "enable CMC to accelerate the recognition of more than \$2 million of extra pretax profit over the next 18 months," according to CMC President Thomas L. Ringer.

Under the new plan, income from remarketing and maintenance presently deferred will be realized by CMC at the time of each alteration, he explained.

Earnings Reports

BARRY WRIGHT

Three Months Ended June 30

	1973	1972
Shr Ernd	\$.31	\$.25
Revenue	9,682,984	8,210,321
aSpec Cred	64,033	12,429
Earnings	506,412	415,321
6 Mo Shr	.54	.44
Revenue	18,943,002	15,739,737
aSpec Cred	64,033	105,376
Earnings	888,497	728,203

a-In 1973 from sale of land; in 1972 from sale of land and buildings.

ALANTHUS

Nine Months Ended May 31

	1973	1972
aShr Ernd	\$.80	\$.88
Revenue	5,887,286	2,510,762
Spec Cred	203,966	133,103
Earnings	856,476	729,399

a-Fully diluted.

COMPUGRAPHIC

Three Months Ended June 30

	1973	1972
Shr Ernd	\$.52	\$.28
Revenue	11,880,000	8,404,000
Earnings	955,000	498,000
9 Mo Shr	1.36	.61
Revenue	33,752,000	20,303,000
Earnings	2,489,000	1,076,000

CONTROL DATA

Three Months Ended June 30

	a1973	b1972
Shr Ernd	\$.95	\$ 1.15
Revenue	229,196,000	166,668,000
Spec Cred	127,000	308,000
Earnings	15,615,000	17,326,000
6 Mo Shr	1.98	1.83
Revenue	432,152,000	295,662,000
Spec Cred	401,000	818,000
Earnings	32,340,000	27,588,000

a-Includes operations of Service Bureau Corp. acquired from IBM on Jan. 12, 1973, in a purchase transaction. b-Restated to include Ticketron, Inc. as a consolidated subsidiary; on June 5, 1973, the company's equity in Ticketron was increased to 99-1/2% in a pooling-of-interests acquisition.

ELECTRONIC MEMORIES & MAGNETICS

Three Months Ended June 30

	1973	a1972
Shr Ernd	\$.27	\$.17
Revenue	26,901,000	17,268,000
Disc Op	146,000
Spec Cred	b604,000	c738,000
Earnings	1,726,000	1,195,000
6 Mo Shr	.54
Revenue	51,644,000	33,889,000
Disc Op	127,000
Spec Cred	b1,348,000	c738,000
Earnings	3,426,000	560,000

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Data Products Scores Records In 1st Quarter

WOODLAND HILLS, Calif. — Data Products Corp., maker of printers and memories, scored record earnings and revenues in the first quarter ended June 30.

Recently, a number of large contracts for both printers and memories have been received, which provide a long term base of production in both areas, noted President Graham Tyson.

Less than \$5 million, mainly the portion scheduled for shipments this year, was added to the backlog, increasing it by nearly \$2 million to \$35.9 million, he noted.

Earnings, including an \$819,000 tax credit, totaled \$1.7 million or 25 cents a share, five times greater than the \$349,000 or 5 cents a share in the comparable 1972 period.

Revenues rose 32%, to \$18.9 million from \$13.9 million in the year-ago quarter.

The 1973 figure includes \$396,000 representing gains on repurchase of outstanding 5-3/4% convertible debentures.

The firm noted that because of capital gains realized in 1969, "availability of a portion of the consolidated tax-loss carryforward in the current year is uncertain."

Total corporate debt was reduced \$3.4 million during the period, Tyson stated.

Inforex Earnings Jump in Quarter, Half

BURLINGTON, Mass. — Inforex, Inc. revealed a substantial jump in earnings and revenues in both the second quarter and six months ended June 29.

June was a record month for

new orders, commented President T.B. Horgan. At mid-year the backlog reached \$12.1 million, up from \$9 million on March 30, he said.

During the quarter the key-to-

disk maker shipped over 2,300 keystations, a 13% increase over the first quarter, he said, boosting the worldwide Inforex keystation population to over 16,000.

In the quarter, sales to Leasing II declined to \$1.5 million from \$1.8 million, but "other sales" rose, to \$3.4 million from \$1.3 million in the year-ago period.

Tax Credit

Earnings totaled \$905,000 or 33 cents a share including a \$368,000 tax credit. In the 1972 quarter, the firm earned \$204,000 or 9 cents a share, including a tax credit of \$175,000.

Revenues during the quarter rose to \$9.1 million from \$5.4 million in the same 1972 period.

In the half year, revenues rose to \$16.9 million from \$9.7 million. Earnings, including a \$707,000 special credit, totaled \$1.7 million or 63 cents a share compared with \$10,000 or 4 cents a share, including a \$175,000 tax credit in the year-ago period.

Microdata Nine-Month Net Climbs, But 3d Quarter Earnings Trail

IRVINE, Calif. — Although Microdata Corp.'s third quarter earnings failed to keep pace with the jump in revenues and dropped below those of last year, the nine-month report showed improvement over the year-ago period.

Lower gross profit margins and increased new product development costs were primarily responsible for the reduced profits in the third quarter, according to President Donald W. Fuller, who noted the firm expends R&D costs as incurred.

In addition, the firm incurred start-up costs in the quarter for its 1600/60 Data Communications System and the 6000 Series magnetic tape drives.

In the quarter, earnings fell to \$53,327 or 3 cents a share, including a \$26,000 tax credit, compared with \$179,397 or 14 cents a share, including a \$93,194 tax credit in the 1972 period.

Revenues, meanwhile, jumped to \$2.3 million from \$1.6 million in the year-ago quarter.

Earnings were up in the nine months to \$575,892 or 37 cents a share compared with \$432,921 or 34 cents a share in the year-ago period. The tax credit for the 1973 period totaled \$271,000, while in the 1972 period it was \$217,890.

Revenues also rose, reaching \$6.5 million compared with \$4.3 million in the year-ago period.

REI Restructuring Debt

DALLAS — Recognition Equipment, Inc. and holders of its 7-1/2% convertible subordinated notes have signed a letter of intent to restructure the \$20.2 million notes.

Within 180 days after execution of the definitive agreement, the company would discharge \$10.2 million of existing notes by paying \$8 million in cash, and by assigning Docutel Corp.'s note for about \$2.2 million.

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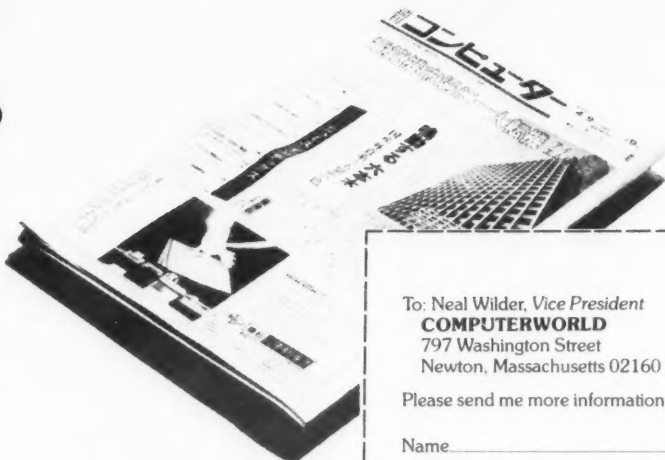
• Initial circulation is guaranteed at 35,000, divided about 80% to end-users and 20% to the computer industry. Circulation development methods currently under way are the same as those which gave *Computerworld* the highest paid circulation in its field in less than four years.

• **Shukan** lets you in on the action in the world's fastest growing EDP market. The Japanese Ministry of International Trade and Industry (MITI) has made the following 1976 forecast: 39,000 general-purpose systems installed, up from 11,237 in 1971; 11,000 minicomputers installed, up from 1,670 in 1971; and 3,000 industrial systems installed, up from 1,086 in 1971.

• Is this growth likely? The latest census of general-purpose systems revealed that there were 14,806 systems installed as of September 1972, a one-year gain of 3,569 units and \$911 million installed value, a growth of 31.7% and 23.1% respectively. And more than 50% of these new systems were American made.

• It is true that there are import restrictions. But Japanese vendors and users can get permission to import almost anything they want and need. As a result, 1972 imports were over \$360 million.

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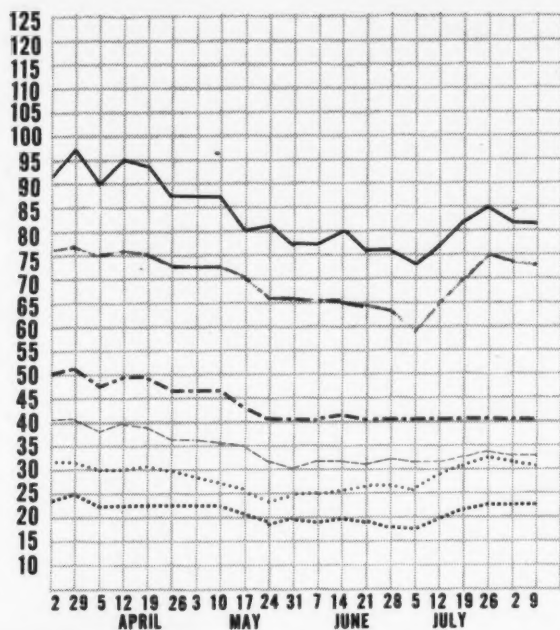
COMPUTERWORLD

Earnings Reports

COMPUTER TRANSCIVER				DECISION DATA COMPUTER				HAZELTINE			
Year Ended Feb. 28				Three Months Ended June 2				Three Months Ended June 30			
1973	1972			1973	1972			1973	1972		
Shr Ernd	\$1.14			Revenue	\$3,928,860	\$3,220,050		Shr Ernd	\$1.24	\$1.17	
Revenue	2,657,098	\$1,760,993		Loss	285,808	628,701		Revenue	18,546,000	15,128,000	
Tax Cred	51,500			6 Mo Rev	7,303,470	438,654		Tax Cred	170,000	237,000	
Earnings	119,463	(473,792)		Loss	681,737	1,176,824		Earnings	468,000	341,000	
WANG LABORATORIES				CONRAC				a-Tax-loss carryforward. b-Tax credit plus gain on sale of properties. The report notes that the 1973 second quarter revenues include all revenue from sales of computer peripheral equipment including outright sales to a new unrelated leasing company. Under lease financing arrangements prior to the second quarter, Hazeltine was subject to a contingent liability for possible returns of rented terminals.			
Year Ended June 30				Three Months Ended June 30				Three Months Ended June 30			
1973	1972			1973	1972			1973	1972		
Shr Ernd	\$0.82	\$0.77		Shr Ernd	\$0.50	\$0.43		Shr Ernd	\$0.24	\$0.17	
Revenue	47,704,529	39,048,987		Revenue	17,076,503	14,819,501		Revenue	18,546,000	15,128,000	
Earnings	3,293,530	3,103,635		Earnings	673,365	580,664		Tax Cred	170,000	237,000	
3 Mo Shr	.38	.27		6 Mo Shr	.95	.81		Earnings	468,000	341,000	
Revenue	14,710,448	12,938,284		Revenue	32,968,061	28,654,921		Revenue	36,875,000	27,142,000	
Earnings	1,532,724	1,100,321		Earnings	1,281,416	1,099,977		Spec Cred	a405,000	b353,000	
								Earnings	909,000	475,000	

COMPUTERWORLD Computer Stocks Trading Indexes

Computer Systems Software & EDP Services
 Peripherals & Subsystems Leasing Companies
 Supplies & Accessories CW Composite Index



COMPUTER MACHINERY			
Three Months Ended June 30			
1973	1972		
Shr Ernd	\$1.11		
Revenue	11,681,802	\$7,882,480	
Spec Cred	b291,400	c107,314	
Earnings	557,398	(617,179)	
6 Mo Shr	.19		
Revenue	22,366,852	11,067,302	
Spec Cred	b567,400	c107,314	
Earnings	943,814	(2,116,675)	

BRADFORD COMPUTER & SYSTEMS			
Three Months Ended June 30			
1973	1972		
Shr Ernd	\$0.20	\$0.13	
Revenue	12,049,953	9,487,675	
Spec Item	9,691	(54,677)	
Earnings	775,274	423,607	
6 Mo Shr	.38	.28	
Revenue	23,695,861	14,375,297	
Spec Cred	19,381	62,143	
Earnings	1,479,298	925,123	

INFORMATICS			
Three Months Ended June 30			
1973	1972		
Shr Ernd	\$0.17	\$0.08	
Revenue	5,332,000	4,787,000	
Earnings	293,000	133,000	

SPERRY RAND			
Three Months Ended June 30			
1973	1972		
Shr Ernd	\$0.68	\$0.52	
Revenue	599,005,000	499,729,000	
Earnings	23,502,000	17,869,000	

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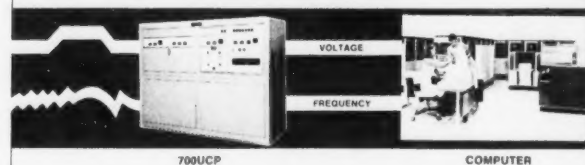
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Computerworld Stock Trading Summary

All statistics compiled,
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PRICE						PRICE						PRICE					
1973	CLOSE	WEEK	WEEK			1973	CLOSE	WEEK	WEEK			1973	CLOSE	WEEK	WEEK		
RANGE	AUG 09	NET	PCT			RANGE	AUG 09	NET	PCT			RANGE	AUG 09	NET	PCT		
(1)	1973	CHNGE	CHNGE			(1)	1973	CHNGE	CHNGE			(1)	1973	CHNGE	CHNGE		
COMPUTER SYSTEMS						SOFTWARE & EDP SERVICES											
N	BURROUGHS CORP	211-245	227	- 5/8	-0.2	O	COMPUTER COMMUN.	1- 4	7/8	+ 1/8	+16.6	O	ADVANCED COMP TECH	1- 2	1 5/8	0	0.0
N	COLLINS RADIO	16- 26	21 1/4	+1 1/2	+7.5	A	COMPUTER EQUIPMENT	2- 3	2 1/8	0	0.0	A	APPLIED DATA RES.	2- 4	2 1/8	- 1/4	-10.5
O	COMPUTER AUTOMATION	5- 16	12	+1 1/4	+11.6	O	COMPUTER MACHINERY	5- 13	6 5/8	+ 1/8	+1.9	O	APPLIED LOGIC	1- 3	1 1/2	0	0.0
N	CONTROL DATA CORP	31- 62	37 1/4	+ 1/8	+0.3	N	COMPUTER TRANSCIVER	1- 6	1 3/4	+ 1/8	+7.6	N	AUTOMATIC DATA PROC	39- 94	56 1/8	- 7/8	-1.5
O	DATA GENERAL CORP	28- 46	40 1/2	- 1	-2.4	N	CONRAC CORP	15- 32	17 1/2	+ 3/4	+4.4	O	BRANDON APPLIED SYST	1- 1	1 1/4	0	0.0
O	DATAPoint CORP	11- 21	11	- 1	-8.3	O	DATA ACCESS SYSTEMS	1- 3	1 3/4	0	0.0	O	CENTRAL DATA SYSTEMS	8- 9	6 1/4	-1 1/4	-16.6
O	DIGITAL COMP CONTROL	2- 6	3	- 1/4	-7.6	A	DATA PRODUCTS CORP	2- 4	3 3/4	+ 1/2	+13.0	O	COMPUTER DIMENSIONS	2- 5	2 1/4	- 1/4	-10.0
N	DIGITAL EQUIPMENT	73-105	91 3/4	+ 3/4	+0.8	O	DATA RECOGNITION	2- 3	1 1/2	0	0.0	O	COMPUTER DYNAMICS	1- 2	3/8	0	0.0
A	ELECTRONIC ASSOC.	4- 9	4 3/4	- 1/2	-9.5	O	DATA TECHNOLOGY	2- 5	2 3/8	- 1/4	-0.5	O	COMPUTER HORIZONS	1- 6	2 1/2	0	0.0
A	ELECTRONIC ENGINEER.	6- 11	10 1/4	+ 5/8	+6.4	O	DECISION DATA COMPUT	8- 40	13 1/2	+ 3/4	+5.8	O	COMPUTER NETWORK	1- 5	1	0	0.0
N	FORRO	23- 36	35 1/4	+ 7/8	+2.5	O	DELTA DATA SYSTEMS	1- 0	1/8	0	0.0	N	COMPUTER SCIENCES	2- 6	3 1/2	0	0.0
O	GENERAL AUTOMATION	22- 55	37	+ 1/2	+12.1	O	DIAN CONTROLS	1- 4	1 3/8	- 3/8	-21.4	O	COMPUTER TASK GROUP	1- 2	1 1/2	0	0.0
O	GRI COMPUTER CORP	1- 3	1	- 1/4	-20.0	N	ELECTRONIC M & M	3- 6	3 7/8	- 1/8	-3.1	O	COMPUTER TECHNOLOGY	1- 3	1	0	0.0
N	HEWLETT-PACKARD CO	74- 95	84 1/8	-2 7/8	-3.3	O	FABRI-TEK	2- 5	3	- 1/8	-4.0	O	COMPUTER USAGE	4- 9	5 3/8	+ 3/8	+7.5
N	HONEYWELL INC	98-139	105 3/4	-9	-7.8	O	GENERAL COMPUTER SYS	5- 9	5 1/2	0	0.0	O	COMPRESS	1- 2	1 1/4	0	0.0
N	IBM	299-340	303 1/2	-9 1/2	-3.0	N	GENERAL ELECTRIC	56- 76	59 5/8	-1 7/8	-3.0	O	COMSHARE	4- 9	4 1/4	- 1/4	-5.5
O	INTERDATA INC	7- 13	8 3/4	+ 1/4	+2.9	N	HAZELTINE CORP	5- 9	5 3/8	+ 3/8	+7.5	N	CONCORDIA CORP	5- 15	5 1/2	- 1/4	-4.3
N	MEMOREX	0- 0	4 7/8	0	0.0	O	INFOREX INC	5- 23	8 1/4	-1 3/4	-17.5	O	CYBERMATICS INC	1- 3	1 5/8	0	0.0
O	MICRODATA CORP	2- 10	3 1/4	- 1/8	-3.7	O	INFORMATION DISPLAYS	1- 2	1/2	0	0.0	O	DATATAB	2- 4	1 3/4	+ 1/4	+16.6
N	NCR	27- 38	36 1/8	-1 5/8	-4.3	O	INFORMATION INTL INC	10- 15	11 1/4	- 3/4	-6.2	A	ELECT COMP PROG	1- 2	1 1/4	- 1/4	-16.6
N	RAYTHEON CO	22- 34	25	- 5/8	-2.4	O	LINDY ELECTRONICS	3- 9	4 3/4	- 1/8	-2.5	N	ELECTRONIC DATA SYS.	29- 56	37 7/8	-2 1/4	-5.6
N	SINGER CO	45- 74	56 1/2	+2 1/2	+4.6	A	MANAGEMENT ASSIST	1- 1	1/4	0	0.0	O	INFORMATIONAL INC	1- 2	3/8	+ 1/8	+50.0
N	SPERRY RAND	36- 50	46 1/4	+ 3/8	+0.8	A	MILGO ELECTRONICS	14- 28	19	+ 1/4	+1.3	O	INFORMATICS	2- 6	4 1/4	- 1/8	-2.8
A	SYSTEMS ENG. LABS	3- 8	3 1/2	- 1/4	-6.6	N	MOHAWK DATA SCI	4- 13	5 1/4	- 1/4	-4.5	O	I.O.A. DATA CORP	1- 1	5/8	0	0.0
N	TEXAS INSTRUMENTS	83-110	105	- 1/4	-0.2	O	ODEC COMPUTER SYST.	2- 6	2	0	0.0	O	IPS COMPUTER MARKET	1- 5	1 1/4	+ 1/4	+25.0
O	ULTIMAC SYSTEMS INC	1- 11	3 1/4	- 1/2	-13.3	O	OPTICAL SCANNING	2- 7	4 1/4	+ 1/4	+6.2	O	KEANE ASSOCIATES	3- 4	3 3/4	0	0.0
N	VARIAN ASSOCIATES	10- 20	13	+ 1/4	+1.9	O	PERTEC CORP	5- 8	5 3/4	- 3/8	-6.1	O	KEYDATA CORP	6- 12	6	0	0.0
N	WANG LABS.	13- 34	23 1/8	+2	+9.4	A	PHOTON	3- 7	3 3/4	0	0.0	O	LOGICON	3- 7	4 1/8	- 5/8	-13.1
N	XEROX CORP	141-169	155 1/2	-2 3/4	-1.7	A	POTTER INSTRUMENT	3- 9	4 1/2	- 1/8	-2.7	A	MANAGEMENT DATA	2- 5	2 1/8	- 3/8	-15.0
LEASING COMPANIES						O	PRECISION INST.	2- 6	2 1/2	0	0.0	O	NATIONAL CSS INC	18- 42	22 1/2	+ 1/2	+2.2
A	BOOTHE COMPUTER	1- 5	1 1/2	0	0.0	O	QUANTOR CORP	6- 10	6	- 1/2	-7.6	O	NATIONAL COMPUTER CO	1- 1	3/8	0	0.0
O	BRESNAHAN COMP.	1- 2	1 1/4	0	0.0	O	RECOGNITION EQUIP	4- 8	5 7/8	- 1/4	-4.0	O	NATIONAL INFO SVCS	1- 2	5/8	+ 1/8	+25.0
O	COMDISCO INC	6- 17	7	- 1/4	-3.4	N	SANDERS ASSOCIATES	7- 18	9 1/2	- 1/8	-1.2	P	ON LINE SYSTEMS INC	12- 17	15 5/8	- 1/8	-0.7
O	COMMERCE GROUP CORP	3- 4	3 7/8	- 1/4	-6.0	O	SCAN DATA	0- 1	2	0	0.0	N	PLANNING RESEARCH	2- 7	3 1/2	0	0.0
O	COMPUTER EXCHANGE	1- 1	1 1/4	- 1/4	-50.0	O	SYCOR INC	9- 14	12	+ 1/4	+2.1	O	PROGRAMMING METHODS	21- 25	23 3/4	- 3/4	-3.0
A	COMPUTER INVSTRS GRP	2- 8	3	+ 1/2	+20.0	O	TALLY CORP.	2- 14	4 3/8	+ 1/4	+6.0	O	PROGRAMMING & SYS	1- 1	7/8	+ 1/8	+16.6
O	COMP. INSTALLATIONS	1- 2	1	0	0.0	O	TEC INC	6- 9	7 7/8	- 1/2	-6.4	O	RAPIDATA INC	5- 24	6 5/8	- 3/8	-5.3
M	DATRONIC RENTAL	2- 3	2	- 1/8	-5.8	N	TEKTRONIX INC	30- 53	40 1/2	+ 1/4	+0.6	O	SCIENTIFIC COMPUTERS	1- 3	3/4	0	0.0
A	DCL INC	1- 3	1	- 1/8	-11.1	N	TELEX	3- 6	3 5/8	- 1/8	-3.3	O	SIMPLICITY COMPUTER	1- 4	1 5/8	+ 1/4	+18.1
A	DEARBORN-STORM	12- 26	19 5/8	- 3/8	-1.8	O	WANGCO INC	7- 13	9 1/2	- 1/4	-2.5	O	THS COMPUTER CENTERS	2- 4	1 3/4	0	0.0
N	DPF INC	5- 9	5 1/4	- 7/8	-14.2	O	WILTEK INC	8- 18	11 1/4	- 1/4	-2.1	O	TCC INC	1- 1	1/2	0	0.0
O	EDP RESOURCES	1- 3	1 3/4	0	0.0	SUPPLIES & ACCESSORIES						O	TMSHARE INC	6- 12	9	+ 1/4	+2.8
A	GRANITE MGT	2- 6	3 1/2	- 3/4	-17.6	O	BALTIMORE BUS FORMS	5- 9	5 3/8	+ 1/8	+2.3	A	UNITED DATA CENTER	4- 6	3 3/4	0	0.0
A	GREYHOUND COMPUTER	3- 6	4	- 5/8	-13.5	A	BARRY WRIGHT	6- 13	7 1/2	+ 1/4	+3.4	N	URS SYSTEMS	4- 8	3 7/8	- 1/2	-11.4
A	ITEL	4- 12	5	- 3/8	-6.9	A	DATA DOCUMENTS	17- 22	21 1/2	+ 7/8	+4.2	N	WYLY CORP	4- 11	5 1/4	- 1/8	-2.3
N	LEASCO CORP	8- 18	10 7/8	+ 5/8	+6.0	O	DUPLEX PRODUCTS INC	7- 10	8 3/8	- 1/8	-1.4	PERIPHERALS & SUBSYSTEMS					
O	LEASPCORP CORP	2- 8	2 3/4	- 1/8	-4.3	N	ENNIS BUS. FORMS	5- 8	6	+ 1/4	+4.3	N	ADDRESSOGRAPH-MULT	12- 34	13 3/8	-1 1/8	-7.7
O	LECTRO MGT INC	1- 2	1 1/4	0	0.0	O	GRAHAM MAGNETICS	9- 20	11 1/4	- 3/4	-6.2	O	ADVANCED MEMORY SYS	5- 23	6 1/4	+ 1/2	+8.6
O	NRG INC	6- 15	5 1/8	- 3/8	-6.8	O	GRAPHIC CONTROLS	8- 12	9 3/4	+ 1/8	+1.2	N	AMPLEX CORP	4- 7	4 5/8	0	0.0
A	PIONEER TEX CORP	5- 8	4 7/8	- 3/8	-7.1	N	3M COMPANY	78- 89	86 1/2	+ 7/8	+1.0	O	ANDERSON JACOBSON	3- 6	4 1/2	+ 1/4	+5.8
A	ROCKWOOD COMPUTER	1- 3	1 1/4	- 1/4	-16.6	O	MOORE CORP LTD	53- 60	56 1/4	+ 3/4	+1.3	O	BEEHIVE MEDICAL ELEC	6- 10	6 1/2	0	0.0
N	U.S. LEASING	16- 36	22 5/8	+ 3/8	+1.6	N	NASHUA CORP	42- 58	49 7/8	- 1/2	-0.9	A	BOLT-BERANEK & NEW	6- 12	6 1/8	- 3/8	-5.7
EXCH: M=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH						O	REYNOLDS & REYNOLD	40- 51	42 1/2	-5 1/2	-11.4	N	BUNKER-RAMO	6- 18	9 7/8	+ 1/4	+2.5
L=NATIONAL; M=Midwest; O=OVER-THE-COUNTER						O	STANDARD REGISTEX	14- 20	15	+ 1/2	+3.4	A	CALCOMP	5- 13	9 1/8	+ 7/8	+10.6
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID						O	TAB PRODUCTS CO	10- 23	9 1/2	0	0.0	O	CAMBRIDGE MEMORIES	8- 15	14 1/2	+2	+16.0
(1) TO NEAREST DOLLAR						N	UARCO	15- 23	17	+ 1/4	+1.4	O	CENTRONICS DATA COMP	13- 32	28 3/4	-1	-3.3
						A	WABASH MAGNETICS	5- 7	6 3/4	+ 3/8	+5.8	O	CODEX CORP	9- 19	11	-2	-15.3
						N	WALLACE BUS FORMS	15- 26	18 1/8	- 1/2	-2.6	O	COGNITRONICS	1- 3	2 3/8	0	0.0

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